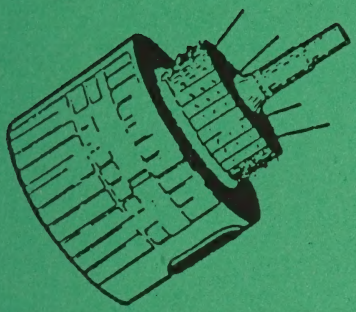
NEWSLETTER No. 11



REMOTE IMAGING GROUP

DECEMBER 1987

R E M O T E I M A G I N G G R O U P (R. I. G.)

N E W S L E T T E R No. 11 D E C 1 9 8 7

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14 Nevis Close, Leighton Buzzard, BEDS LU7 7XD
Tel: (0525) 384419 7.30 to 9.30 pm Please, General enquiries & PCB's

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Editorial and Secretaries page

Let me open hoping that everybody had a good New Year and made appropriate resolutions to receive even more weather satellite pictures. The newsletter bears the DEC 87 date but due to problems at this QTH it has been delayed, I hope the wait was worthwhile. The next issue is due out before the end of March.

As you may know subscriptions, which run January to December are now due for 1988 and the subs form together with a membership survey can be found as yet another centre-fold pullout.

The membership survey is intended to find out what RIG members are doing and perhaps what they would like to do by comments on the reverse side of the form. We will publish the results of the survey in a later issue. The questions on the bottom of the form are especially important. The RIG wants to encourage members who live reasonably close to each other to know of each others existance so that help can be given or experiences shared. This information will only be given out on request and only for those members whose willingness to be known has been indicated on the survey form.

This month (Dec.) disturbing news comes from one of our more experienced members, Les Currington, who complains of reception problems being 'caused' by a new chain of VHF transmitters being installed by Mercury Communications. The transmitters operate just above the satellite band 136MHz - 138MHz. When heard the signals consist of a repeated sequence of a tone followed by a short, say 2 secs. of what sounds like data. If you have listened to a home micro loading a program from tape you will know what I mean. I understand these devices are being installed to give nationwide coverage for the Mercury communications system. If you are having problems do use the survey form.

On another tack Adrian Buchann from Brixham and James Brown have reported signals on 137.33MHz. These reports have been confirmed by Geoff Perry as coming from Cosmos 1602. The satellite is reported as giving good visible light pictures around midday.

Finally you will find a plethora of 'centre-fold' pullout circuit diagrams in this issue. Ideally they should be close to the corresponding articles but getting them small enough and still remain legible was the problem. Even so the crossed zeroes in the FAX transcoder diagrams may not be distinguishable from eights. If any member whats a reprint then do write in.

Hope to see you again in the at the rallies or perhaps the agm,

Phil, G8XTW

CHAIRMANS REPORT.

As 1987 rapidly draws to a close and 1988 arrives, I look back over the past year and think "That didn't take long!" It must be a sign that I, like every other mortal, gets older by the day. But even if time passes quickly it's nice to think back and remember the things that have happened in 1987. Yes I know we don't remember the bad things like Henry blowing up the GASFETS and woe betide Henry for he has done it yet again. He's blown up the latest one! I put another RF amplifier after the GASFET just to see what happens and the system just took off RF-wise - net result, one duff GASFET. This time my flexible friend needed a rest, so at present I am just using the NE64535 based amplifier into the M.M. downconvertor, still producing very acceptable results, but not as good as the GASFET.

If you remember we obtained a supply of 1 metre dishes and you certainly liked them, it wasn't long before we had to order another batch, but these are lasting much longer - you've obviously got the fibreglass out and made some for your friends. The Dartcom downconvertor has sold well and I am told it performs so well that if the cable from the antenna is short then no preamplifier is necessary. I think that I shall be joining that happy band of Dartcom owners in the New Year if my flexible friend has recovered enough. We've done all our regular rallies etc but we have yet to find a rally organiser, I hope Phil and Peter keep doing this job, albeit as a temporary measure. But really folks, we do need someone to do this job.

Also in 1987 we did the impossible, we obtained approval from the DTI that all paid-up members of RIG are accepted as having that magical piece of paper that authorises you to receive signals from NOAA and METEOSAT etc. I have actually seen one of these so they do exist. Several years ago I requested one for myself, I was told that they had my address and if there was any problems in the meantime to contact the DTI and they would sort it out! Well the paper never did arrive, and as it didn't cost anything, I didn't really worry. But all that will not be necessary in 1988. All you have to do is to make sure your subscription is paid quickly. On the subject of subscriptions, we are still maintaining the cost at £4.00, and I don't think a single one of you can really say that we don't give value for money. We even increase the service we give, when possible. So, give Des Watson's postman backache and burst his mailbox this next few weeks. Because if the Secretary doesn't mess up this year's subscription renewal form this could be the last Newsletter you receive - unless you <u>renew!</u>

After the miracle we obtained from the DTI a lesser, but nevertheless seemingly impossible thing has happened, we actually have started on the beginners guide. Part I is in this Newsletter. We have been asked for one for several years and eventually we had to start. I have written the first one and it has been deliberately written from a non-scientific viewpoint, in as simple a terms as possible (ED's note: He means simple). It will no doubt become more and more complicated as it goes along, but if anybody cannot follow this episode perhaps they ought to take up another hobby.

Now for an update on the 1700 MHz Yagi which I gather several of you are more than interested in. I started with a conventional Yagi but after several versions, and much frustration, it finally evolved into the G3JVL Quad Loop Yagi. Remember that the "VHF Communications" product costs 398 Dm, equivalent to about £135, and knowing my luck, extra for duty or tax. I was lucky in obtaining 8 foot of 15 mm square aluminium tube, but instead of using that to start with I tried a short - 12 element on a length of 0.125" brass rod, and it worked reasonably well and showed promise. After some more hours with a calculator, and a few phone calls to Roy Powers, the design was finalised (famous last words). The 8 foot of square tube was brought out and used. After about 3 hours, there it was, as well as a painful backache. I won't go into the constructional details until a later Newsletter as the design needs to be field tested, but it all looks good. Estimated gain is about 22dbi, beam width to 3db is 15 degrees horizontally and 17 degrees vertically, so it does tie in well with theory, but these figures need to be confirmed. The "VHF Communication's" one claims a 20.1dbi, so the extra 2db comes in handy and I personally believe it might be over 22dbi. We shall have to wait and see. The cost? Well as you know, I am ever so practical and use the most cost-effective things I can lay my hands on. The end product will, I hope, bear this out without compromising results. You will be able to make your own or buy one from yours truly if all goes well. But as usual the road of good intent is a very difficult one to follow.

Recently I have had phone calls from a few people asking for help in their own part of the country. As I mail the Newsletters at present I take the liberty to photocopy all the address labels. This gives me a nearly-up-to-date membership list. With about 20 minutes of checking these lists I am usually able to give the person say 4 - 10 RIG subscribers addresses in their own county. Perhaps this is not quite what some of you would like, but I think the majority of you would only be too willing to help say a school or an individual to get set up and get their system performing as well as could be expected.

To enable me to continue to do this I would like you, on the membership renewal form to indicate that you would/would not like others, on request, to be given your address in say your own county, or perhaps a neighbouring county if someone lives near the boundary.

Also to get further information but keeping it as simple as possible, would you indicate in the survey boxes if you are active in receiving copy or passive (ie just reading and not active). While also on the questionnaire subject, several members are working very hard on programs for the more sophisticated PC. Boxes are included so that anybody with a particular computer might be able to help another member with the same equipment. It all sounds like a mammoth job, but it could be very worthwhile in the future. This leads me to the next subject - IBM-type PCs, the PC/XT/AT types. "VHF Communications", in their 3/87 edition, have an interface to enable a Framestore to be interfaced with a PC and the captured image can then be stored or handled, perhaps even enhanced. Several of you will be interested in reports and if you know of a subscriber to "VHF Communications" you will have to have a word with them, or subscribe to it yourself. Phil tells me that after a quick look at the software he didn't think it was complete but he will be checking. A phone call to Phil should get you up-to-date information, he is certainly following this as he has an IBM PC himself.

As I'm not sure when Newsletter 11 will get posted may I wish you all a very Happy Christmas and Seasonal Greetings, and your continued membership in '88. Over this period I like to think that it is a time when we can all settle down and get just a few of those unfinished projects finished, remembering that you are not the only one working away. It does seem so apt that over Christmas and the New Year period we all just think of others in the peace and quiet that sometimes occurs, and sit back and reflect on what has been done, and what we'd like to do. It seems to go well with those frosty nights, when it has possibly been snowing; well it does to those of us who live in the Northern Hemisphere!

Best wishes, and Seasonal Greetings,

Henry.

FM TAPE RECORDER ADAPTER
by James Brown.

One of the problems associated with weather satelllite reception is the recording of the signal for the purposes of later analysis, processing and print-out. Photographic prints either off screen or from FAX machine are one method of archiving data, but cannot then easily re-processed with eg. contrast expansion, gamma correction etc. However, the fact that 2.4 Khz (2.5 KHz for some Meteors) has been chosen as the final sub carrier means that it can be directly recorded on to a domestic tape recorder. (usually with a reference tone on the second channel). The inherent problem with this method has always been the limitations of the tape recording system its self. The standard recorder whether reel to reel or cassette suffers from a number of drawbacks which at times disappoint us "perfectionists"! The shedding of minute particles of oxide from the tape itself or momentary loss of contact with the tape head cause "drop outs" which show up as annoying streaks or smears on the picture. Further unevenness in the recording method may show up as variations in picture amplitude. All of these problems will of course will be solved when we're equipped with the latest generation of digital tape recorders now making their debut. (the tape equivalent of C.D. players). It is also possible that some of the more sophisticated home computers with a good graphic system and high density disc storage also offer hope.... but for those of us with more modest budgets how about spending a tenner on converting your tape recorder to F.M?

The beauty of F.M. tape recorders is the same as decided the satellite designers to opt for F.M. as a transmission medium. i.e. variations in signal strength no longer affect the amplitude of the recovered signal. Most tape drop-outs are not 100% and the demodulator in the system to be described only needs a tiny amount of signal to give a perfect playback. However, and it is a big however, our system though not amplitude sensitive is now phase and frequency conscious, and changes here will be represented on play back as amplitude variations. In all the experiments conducted by my self and verified by Les Currington, we have found it impossible to obtain perfect results using conventional cassette recorders, however 'Hi-Fi'. Readable pictures are obtainable using almost any recorder, but there is a definite worsening of the S/N ratio in a new way which suggests that either the huge equalisation networks needed for 1.7/8 i.p.s. or the greater flutter is producing enough phase/frequency changes to degrade the signal...possible R.I.G. members would like to experiment themselves here to see if it is possible to overcome this, but using a reel to reel recorder, running at 1.7/8 i.p.s. it has been possible to obtain pictures indistinguishable from live.

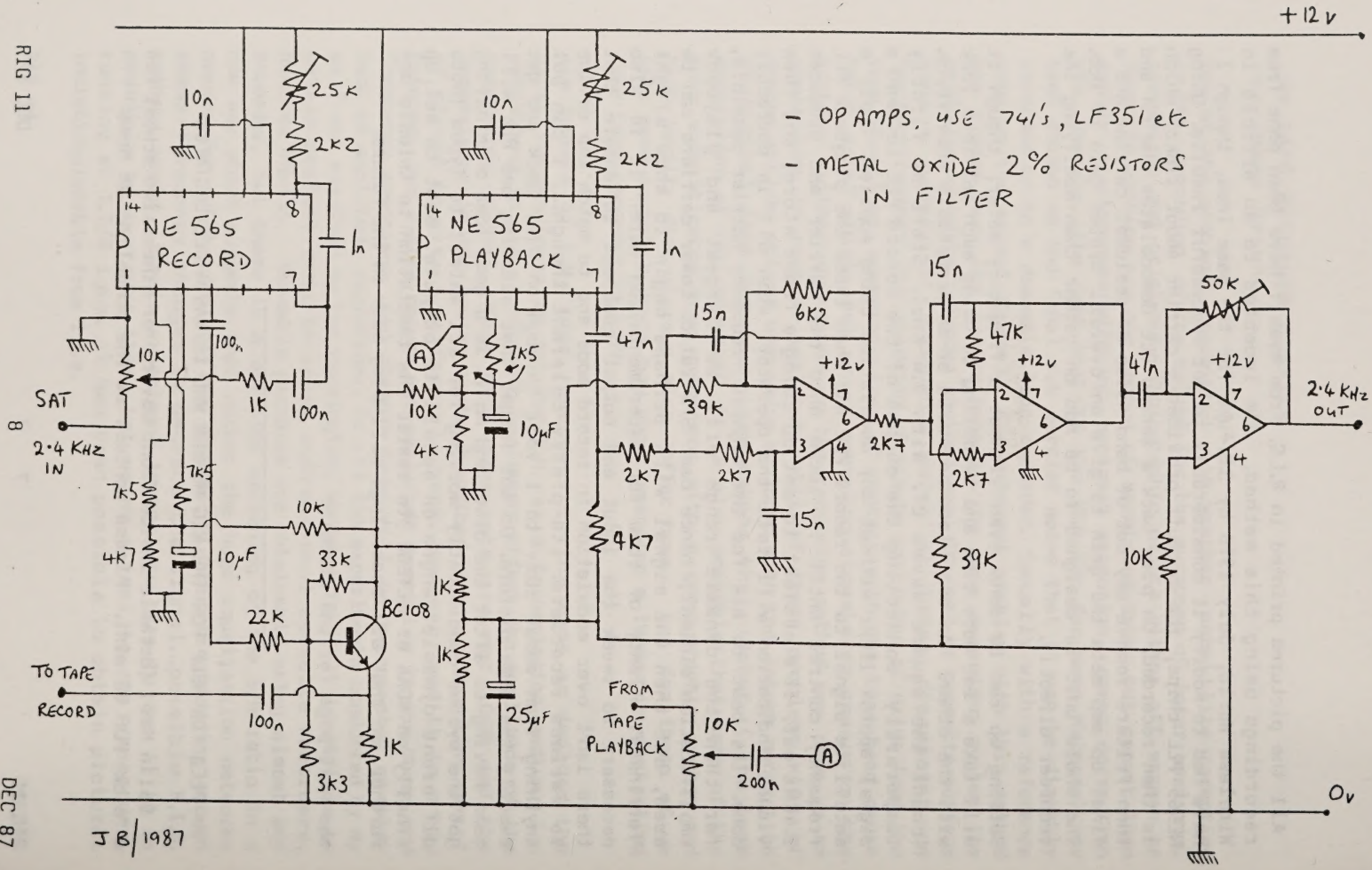
All the pictures printed in R.I.G. from myself have been done from recordings using this method. I'm indebted to an article in Wireless World, July 1976 by J.B.Tuke for the base idea, though I have had to modify it considerably to get successful results. Using NE565 PLL chips, the circuit provides a carrier about 11HKz, which is then recorded. On play back a second PLL demodulates the FM and then filters remove any out of band noise or residual carrier and a final op amp sets the gain to give an overall system gain of 0db. The whole unit is designed to be add on rather than modifying the recorder directly.

Setting up can be done even without a frequency meter, though it will take a lot more time and twiddling to bring each 565 into lock with the other. An oscilloscope would be an acceptable substitute. (count the square waves cf. with 2.4 KHz). Start by firstly temporarily connecting the output of the record PLL to send a signal approx 11KHz without any modulation being applied. Apply a satellite signal to the record PLL and then tweek the playback PLL frequency control until it locks onto the carrier and produces 2.4KHz out. It's easiest to set up using a frame store, and then visual indication will tell the operator when all is correctly done. Its best to aim for the highest frequency carrier possible, for then the dynamic range will be largest and playback amplification minimal, hence best S/N ratio. Lower carriers can be used, but then the signal will perhaps begin to show slight 'furriness'. Plenty of room for experimentation here! It is also necessary to tweek the input and output controls to ensure that there isn't over modulation in record mode and to match the device to various recorders. Its pretty tolerant though.... I can put anything from about 10mv to 1 volt through on play back and get exactly the same picture. Do not forget that altering one PLL will mean having to alter the other,and so it is a good idea once having got the system consistently working for all satellite types (note different dynamic ranges on satellite outputs, best to set up finally on NOAA or METEOR)to resist the temptation to twiddle any further, so that all recordings will play back in the future.

see next page for the circuit.

PLEA FOR HELP FOR THE RIG MEMBER WHO IS/WAS A DEC ENGINEER

Colin Hall (details inside front cover) of Ninestiles school has a 'sick' PDP 8E mini. Please contact at the school or at home.


RIG 11
+12 v
- OP AMPS, USE 741's, LF351 etc
- METAL OXIDE 2% RESISTORS IN FILTER
NE 565 RECORD
NE 565 PLAYBACK
10n
25K
2K2
1n
100n
10K
1K
SAT
2·4 KHz IN
7K5
4K7
10µF
33K
22K
BC108
TO TAPE RECORD
3K3
1K
25µF
FROM TAPE PLAYBACK
200n
47n
15n
6K2
39K
2K7
50K
2·4 KHz OUT
0v
JB/1987
DEC 87
8

THE MUIRHEAD K400/401 FACSIMILE MACHINE
by Guy Martin

Quite a few members will have recently purchased these machines from a colleague of mine, Brian Week's and are perhaps wondering how to use them for weather Fax. Here's what to do with them. The machines will almost certainly be in working order, they rarely go wrong in service and the best way to use one of these machines is to leave them unmodified and instead condition the signals to be fed in. This can be done easily as we are dealing with audio signals. Before switching on the machine, leave it in any warm dry place until any condensation or damp has gone. Remove the covers and sweep out any dead spiders and examine it for any obvious problems like burnt out components. Assuming all is well place a roll or a piece of paper between the writing edge and the helix (if the M/C starts on switch on you don't want the metal writing edge scraping on the helix making sparks, and dents!). Switch on, a buzzer may sound to indicate the paper has run out if there is no roll present.

These machines work on a FM signal, 1300 Hz is black and 2100 Hz is white, the machine will start and continue to run if black is present in the signal and will stop marking and feed out the document when only white has been present for several seconds. (950Hz and 1150Hz supervisory signals are also sent but are of no interest to us). This means that the charts Ex Bracknell on 4782 KHz etc can be fed straight in if received on an SSB Rx with the BFO correctly ajusted. In order to use this machine for Meteosat/NOAA we have to do the following:

1). Detect 300Hz start tone and use it to send a signal to the machine.

2). Arrange that there is always some black in the signal. This is best done by replacing the 840Hz stripe with black.

3). Detect 450Hz stop signal and use it to remove the signal from the machine.

The 2400Hz AM signal is detected in the usual way and used to modulate an FM carrier such that black is 1300Hz and white is 2100Hz. Those of you have a redundant K400 Transmitter could use the FM modulator board from this unit.

There are also possibilities for contrast enhancement, gamma correction black and white clipping and other and other processing of the signal (such as gradually increasing the gain as the picture steps Northwards - useful for winter visible pictures) to take place before remodulation.

There is a /M series machine which uses 300/450 Hz for start and stop instead of the above.

The other problem is to make the machine to run at the correct speed. We have to make a crystal locked source to drive the motor in any case as the mains is not nearly stable enough and as these motors can be driven with any frequency (within reason) all we have to do to make a machine that runs at 180 RPM (K401/D) run at 240RPM is feed the motor with 66 2/3 Hz. Adrian Nash has already published some of my circuitry for modifying K401/B machines and the circuits that follow are similar. A few notes about the motors might be of interest. With exception of the K401/B two types are used, both are 2 phase:

1. E49/D3 3000 rpm 115 volt at 27W
2. E49/A6 1500 rpm 240 volt at 27W

The K401/B uses a much larger motor (in order to get 500 rpm with any torque), however the motor from the K400/B transmitter can be substituted (with some suitable mounting plates) and modifications continued as above. Steppers or PC motors may be substituted, if available, with the necessary drive circuitry.

You have a RIG receiver!
Have you a BBC micro?

If so, use our Digitizer to interface between your receiver and the BBC micro. This will allow you to display weather satellite images in mode 1 and mode 2 resolutions. Images so produced may be enlarged, colour high-lighted and stored on disk. The image may be inverted for those North/South passes and text may be added for easy reference. Every interface is aligned, tested and ready to plug into the user port on the micro. Software is on a 40 track disk. £39 including P&P. INFOTECH SYSTEMS 14 CONWAY CRESCENT BEDFORD MK41 7BW.
Other detais: Same input level as the YU3UMV frame store. Output via 20 way ribbon cable terminated in an IDC plug. Solder pins for the connexion of slip switch and LED on indicator. DC supplied from the micro (CMOS IC's used). Software features: Zoom, printer dump, slip, colour palette, stored image transfer. System supports NOAA, METEOR and METEOSAT. Not a kit. Full documentation. Tel. (0234)56139.

Fax Transcoder - a realisation of ideas
by Guy Martin

Having obtained one of Brian Week's FAX machines and tested it throughly I have discovered the following. The machine is FM and rotates at 180 rpm. An input tone of 2100 Hz giving white and 1300 Hz black. Frequencies in between give shades of grey. These machines also start on 300 Hz (modulated on the carrier - not direct input) and stop on 450 Hz. Therefore all that is required is to use this machine on Meteosat is to decode the signal that is modulated on to the 2.4KHz subcarrier and remodulate it as FM with black at 1300 Hz and white at 2100 Hz. The other problem is to drive the motor with a crystal locked source of 66 Hz. If an off air subcarrier is used to lock the motor then Meteosat/NOAA may be recorded on a good quality tape recorder without a control track. The following is a modification of a circuit I have used for about 10 years to drive the K401/CH machines which use AM on a 2500 Hz subcarrier, max amplitude being black (inverse modulation to Meteosat). Obviously if using this circuit for NOAA, manual start and stop controls have to implemented which switch the signal away and inject 300/450 signals for start/ stop. Charts from Bracknell may be fed in direct except charts with IOC of 288 which use 675Hz start tone and this needs to be detected and changed to 300 Hz. Alternatively the 300 Hz start detector on board PC1186 may have its capacitor values switchable (C6?) for 300/675 Hz. The following circuit is drawn for Meteosat but is very easily modified for other modes.

IC 5 is an amplifier which simply level raises to a convenient level. IC1 is a limiter for the 2K4Hz subcarrier which locks IC2 which generates 4.8KHz. IC6 and IC7 form a precision rectifier (this inverts the -ve half cycles), balance and gain controls are provided to equalise the gain and DC level of the two half cycles. A simple low pass filter at this point will give you video out. As the highest video frequencies are near to the subcarrier frequency, it also rolls off the fine detail in the picture. For the purists a sample and hold detector follows. One half of IC4 delays the 4.8KHz sample pulse so that it sits in the middle of a rectified sinewave peak, the other half ajusts the pulse width. This circuit is best set up by observing start or stop tone and adjusting delay and width for the best squarewave o/p.

The circuit that follows is optional. IC11 is a gain control stage, both as a front panel gain control, and a circuit enabled by the start latch (not shown diagram-see frame store) which generates a ramp with a period of 4 mins, the amplitude of which is set by the four position switch.

This has the effect of of increasing the gain as the picture proceeds, useful for winter N. Hemisphere VIS formats. This is followed by a gamma or black stretch stage.

This amplifies black more than whites and provides better contrast between sea and land and also compensates for non linear characteristics of the paper. As the o/p increases it overcomes the black bias on the diodes and switches extra resistors in parallel to reduce gain. This circuit is fairly fiddly to set up. There then follows a black and white clipper. High speed schottky diodes are essential here or only soft limiting will be achieved. The black clipper is very important as the Alfax type 79 paper has to be set up accurately to get a good black. A slight change of signal level could cause the signal to go below black at which point the writing edge neatly cuts through the paper and starts making sparks on the helix-not a good idea. You could also loose your picture. The final stage is an FM modulator. The DC control sets the signal on 566/5 to be +11v on black. Freq pot is now set for 1300 Hz output. Gain is now set with white signal applied so that o/p goes to 2100 Hz. This signal may be fed direct to the signal i/p of the M/C.

MOTOR DRIVE UNIT.

Crystal oscillator 4.915 Mhz is divided down to 2.4KHz in 4040. When used for Metosat/NOAA external 2.4KHz locks the 567 and allows the ext 2.4KHz to lock the crystal via 4046. If a noise burst interrupts NOAA the crystal lock continues. FM fax (eg Bracknell) disconnect the lock loop and M/C remains crystal locked. Signal is divided by three in 4027 and by use of two diodes connected between numbered o/ps and pin 7 also selected letter o/p of the 4518 various frequencies can be obtained per the table. This is amplified and fed into a reversed mains transformer to 115v or 240v according to motor requirements. When M/C is idle control wire F is at ov and transistor BC107 shuts down 723. 723 set volts pot (2K2) should be adjusted for correct motor voltage on load (approx 27v).

If anyone has any trouble with these machines they may contact me. I have been using them for hard copy now for about 10 years and have had excellent results. I do not have drawings for the / D machines but the motor electrics are the same on all machines, only the signal circuits differ between suffixes.

If using the previously described Motor Drive Unit at 33 Hz a reasonable size O/P transformer should be used as iron losses are considerable at this frequency. A new circuit is presently under design avoiding transformers.

Thanks are due to Adrian G6ZHZ for writing an interesting article from a few notes and scrap drawings I gave him with a machine purchased from me.

Some follow up thoughts from Guy:

Whilst lining up a friends YU3 framestore it occurred to me that it should be fairly easy, if a computer with a parallel in/out port was available, such as the BBC/B, to hoover out the picture from the frame-store and into the computer. It could then be picture processed using look-up tables to contrast expand, gamma correct or generallymonkey around with the picture. It could them be re-inserted into the frame-store, or, saved to disc or sent out to a fax machine once a pleasing result had been obtained. A possible way to do this would be by clocking the write counters, redundant once the picture is in memory, with a pulse from th vcomputer. Write would have to be disabled in this mode, and to be invisible on the display would need to be done during the line blanking. If only one pixel was grabbed during each line blanking period the whole performance should be completed in 4.2 seconds.

Incidently anyone requiring info or help in using these machines is welcome to write to me (NO Phone Calls please), SAE enclosed at tyhe address below:

Guy Martin, 14A Arthur Road, Biggin Hill, Westerham, KENT TN16 3DD.

In common with the supplier of these machines, I sometimes work away from home so dont expect an immediate reply, but all correspondence will be answered.

Guy Martin

The circuits for:

a Faxtranscoder,
b PC1185/2,
c Motor Drive Unit
d Picture processing Amp.

can be found in the centre pages as they are intended to be pulled out as required.

Weather Satellites Orbits For Beginners.

by Dick Boardman

There are two types of weather satellite, the far distant Geostationary satellites which always appear in the same place in the sky and the much closer, fast moving, 'Polar Orbiting' satellites which are the subject of this article.

Polar orbiting satellites orbit the earth at a height of about 750Kms. They travel once around the world in about a hundred minutes. The path of each satellite maybe thought of as forming a thin ring (orbit), fitting snugly round the world passing close to the two poles (the diameter of the ring is about 10% more than the diameter of the world). The ring moves only slowly relative to the sun but the earth spins more quickly inside it. Thus a satellite which crosses the equator,going north, above the west cost of Africa at noon, local time, will go right around the world and across the equator again, going north, 100 minutes later but in that time the world will have turned about 25 degrees so that the crossing will be made in the middle of the Atlantic. However the satellite will still be in the same place relative to the sun, so that it will still be noon local time, at the crossing point. The effect of this is that a satellite passes overhead fairly close to any point on the earth's surface twice a day, once when it is moving from north to south, and once 12 hours later when it is moving from south to north.

As an example take the American weather satellite called NOAA9. The ring containing this satellites path is almost edge on to the sun so that the satellite moves from the south pole, in full daylight, across the sunny face of the earth, to the north pole, then across the pole, into the earth's shadow, and down the other side, in darkness, to the south pole where it moves into the sun again. If an observer could ride in NOAA9 he would see a lovely sunrise and sun set every 100 minutes. As the satellite crosses the sunny face it is always early afternoon at the point just below it and as it crosses the dark face it is always just after midnight at the spot just below it.

Rather different is the other active American satellite which is called NOAA10. The orbit containing this satellite's path is almost face on to the sun. If an observer was able to ride in NOAA10 he would almost always be able to see the sun but the world beneath him would be half sunlit and half dark. As he moved from the south pole to the north pole it would always be early evening just beneath him and, as he moved from north pole to south pole, it would always be early morning underneath him.

There are several Russian weather satellites, with names like Meteor or Cosmos. Their paths vary in time while the American ones stay fixed, relative to the sun. Sometimes a Russian maybe a mid-day satellite and then perhaps a month later it may pass in the morning or the evening. This makes them more difficult to predict, particularly as the Russians have a habit of changing their orbits fairly frequently. (The Russians use the satellites for their program of work and switch them off if they have no use for the data). There is also the problem that the Russian satellites usually only transmit when the ground beneath them is sunlit. Most beginners start with the NOAA satellites and defer searching for the Russian signals until they have a computer and a prediction program. Even then it is not completely straight forward.

The pictures sent by all the satellites show a narrow strip of the world beneath them. The so called satellite picture shown on T.V. weather forecasts are actually composites made up from several real pictures. The images are sent as a series of lines, just as a TV picture is sent, but whereas a TV picture is received faster than we can see it, a satellite picture is built up, line by line, over several minutes.

For most amateur purposes, the best pictures are received when the satellite is nearly over head in full daylight although the pictures are formed from infra-red light, sent at night, can show a lot of interesting detail. Thus NOAA9 can nearly always be relied on for a good picture in the day time.

In London we start receiving a north going nearly 'overhead' NOAA9 picture when the satellite is over north Africa. At this point it just appears over the horizon. It then continues, passing over France England and Iceland until it disappears over the horizon over Green land. The longest pass may take up to 12 minutes.

A south going pass over the UK, about 12 hours later, will start over the Arctic to the north of Russia and continues over Finland and Norway to England and then on to Western France and Spain before disappearing over the horizon just off Gibraltar.

In practice, it is possible to receive other passes which are before and after the best pass, provided the satellite is over the horizon. Such passes will be received one hundred or two hundred minutes before the best pass. By this means it is possible to receive pictures of the Caspian Sea to the East and of Newfoundland to the West.

Such passes will be shorter, perhaps only one or two minutes, but well worth searching for. If you receive a 'nearly overhead' pass one day there will be a similar pass the next day but it will be between twenty minutes and half an hour earlier, and a little further to the east.

The times of the best passes of the NOAA satellites are given in the centre pages of this newsletter. These are the times when the satellite crosses the equator. The signal will first be received in England eight minutes later for north going passes and twenty minutes for south going passes.

There is no completely accurate method of predicting a satellites path and, since they do about a thousand orbits in three months, errors do tend to accumulate. Hence the predictions lose accuracy as they get older. The oldest predictions maybe plus or minus five minutes. Each new set of predictions is based on actual measurements.

A Beginners Guides - it starts here:
by Henry Neale

Over the past years I have had requests for a beginners guide to weather satellites. There seems to have been quite a few just recently, and the committee have decided we must do something about it. I was chosen to write the first article, and other members will do their part in due course. It is essential that the whole series is started at a very simple level and doesn't get too complicated too quickly, so that everybody can understand it. If anyone does have problems understanding specific parts please do not hesitate to talk to someone for further explanations.

At the start I think I must warn any intrepid reader that everything that follows is addictive and even though it doesn't require a government health warning the spouse will eventually wish there had been one somewhere. It's all an interesting story of innovation, ingenuity and many other skills, but, as is so often the case, something simple is often the most effective. Every minute of the day there are radio signals transmitted down through the atmosphere from the various bits of ironmongery that orbit the Earth. They might have been launched by anyone of several nations with launch capabilities. There are many different types of satellites, but quite a few specialises in viewing the Earth below for meteorological purposes, and images can be easily decoded from these signals, these we refer to as "weather satellites".

Most weather satellites transmit their signals in the 137/138 MHz band and the signals are quite strong and are not difficult to receive. A simple dipole will give quite passable results for a beginner. The most commonly used aerial system is the crossed dipole with crossed reflectors, connected for right hand circular polarisation, but I am getting technical so I will generalise by saying that a very simple aerial will give results. It is not necessary to have a very high aerial, but the aerial does require to have as good a view of the sky as possible---like an astronomer would like. It is only the specialists that likes the view unobstructed down to the horizon. Preferably the aerial sight is not very far from the receiver, if however this is not possible then a preamplifier will be required at the aerial itself. I use as a guide figure of 30ft of thin coaxial cable-say 1/4" and 45ft. for thicker 1/2" coaxial cable before a preamp is needed. If we then look from the other end of the cable, because with good weatherproofing and good engineering, that is all that most enthusiast really think about aerials (unless things go wrong), it's just a cable coming through the wall/window etc. with a signal on it. The next unit required is a receiver.

There are several models available on the market and I will not make a comment on the performances of individual makes, but I will advise you to find out from a colleague. Of course available finances comes into it, higher prices usually result in good performances and better facillities, but even so, good performance can be achieved with simple and cheap equipment. The fundamental requirements are for a receiver that covers the 137-138MHz band and suitable for 50KHz frequency modulation. It can be either selectable fixed channels or a more complicated phase locked receiver. The 50KHz band width is most essential for the type of satellite that you will be starting off with.

You now have an aerial of sorts positioned in a relatively clear location connected by coaxial cable to a receiver. What do you get from the receiver?-just a bleeping sound!-that eventually gets on everybody elses nerves (well it soon will do). This is where the intrigue comes in because you know that with the correct equipment there would be an image of somewhere coming down that cable and out of that speaker. Whats more you can prove it with the help of a friend who has the right equipment. If a tape recording is taken of this bleeping noise, with the proviso, that instead of a microphone a direct connection is made between the receiver and the tape recorder. This might present problems, because some tape recorders saturate on very strong signals, so a simple attenuator might be required (only two resistors). If you have got this far, it will not take long before you will be recording everything that comes out of the speaker "just incase".

If I go any further I shall have to go into more technical detail so I will leave it for now and let the others baffle you with science - well I hope not but I will recap the system so far described.

A VHF aerial is required and it requires to be sited so that it can see as much of the sky as possible with as few obstructions as possible. A chimney is often used, but remember that if the sky is clear at 10ft high why not go to 30ft high to get the same amount of sky----all you get is 20ft more cable loss. This cable feeds the signal to wherever you can find a convenient location to get lost in for considerable lengths of time. The signal is passed onto the next box, a receiver, which might be the very good DARTCOM 137MHz receiver, or a modestly priced unit of your fancy. The result is still the same---a bleeping sound. As with all thrillers I will leave it just coming out of the speaker for this episode and advise you to look out for the next installment in the next Newsletter. Till then I bet you cannot get that bleeping sound out of your ears (nobody else can)---you are well on the way to becoming addicted so be warned.

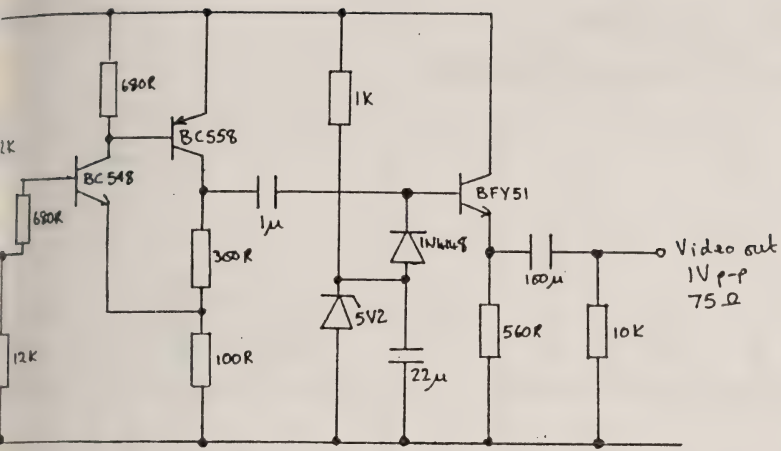
If you require a happy wife take small doses!

Henry

This months most excellent satellite pictures come from James Brown and Peter Wakelin. Peter Wakelin recently spent some time in the southern hemisphere and recorded some excellent pictures. Other members operating outside the UK nad mainland Europe are invited to submit such recordings. As long as they are reasonably noise free we will be able to make a good picture for the newsletter.

During 1986 an unprecedented amount of ice broke away from the ice shelves of the Weddell Sea. This included two large pieces from the Larsen shelf on the Eastern side of the Antarctic Peninsula and by mid February 1987 they had drifted to the North East of Clarence Island. The Meteor 2-15 picture which is one of this months pictures, received in the Falklands shows the two huge tabular bergs, each about 100 Km across, visible through thin wave cloud generated by the mountains of the Antarctic Peninsula and adjacent Islands.

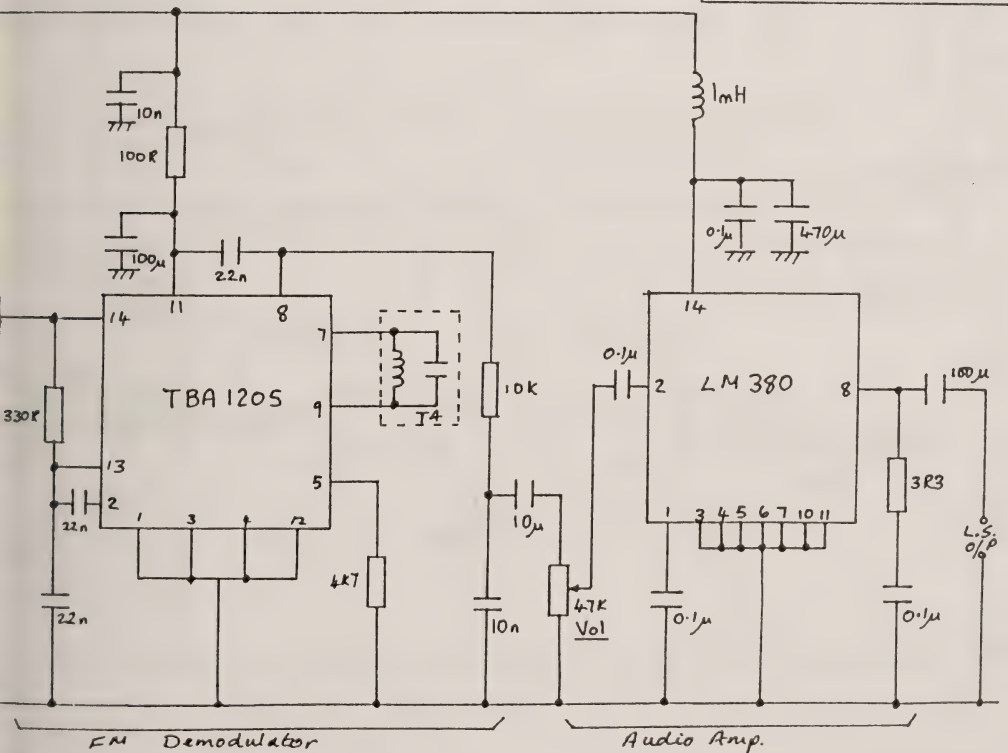
Peter Wakelin



T_1	T50-2 Core; pri 14T, sec 5T (24swg)
T_2	Neosid core 10K1; a-b 6T, c-d 3T, e-f 12T (36 swg)
T_3	Toko KACSK3893A
T_4	Toko KACSK586HM
L1	22 µH axial inductor
CF1	CFSH 10.7 M1

SING

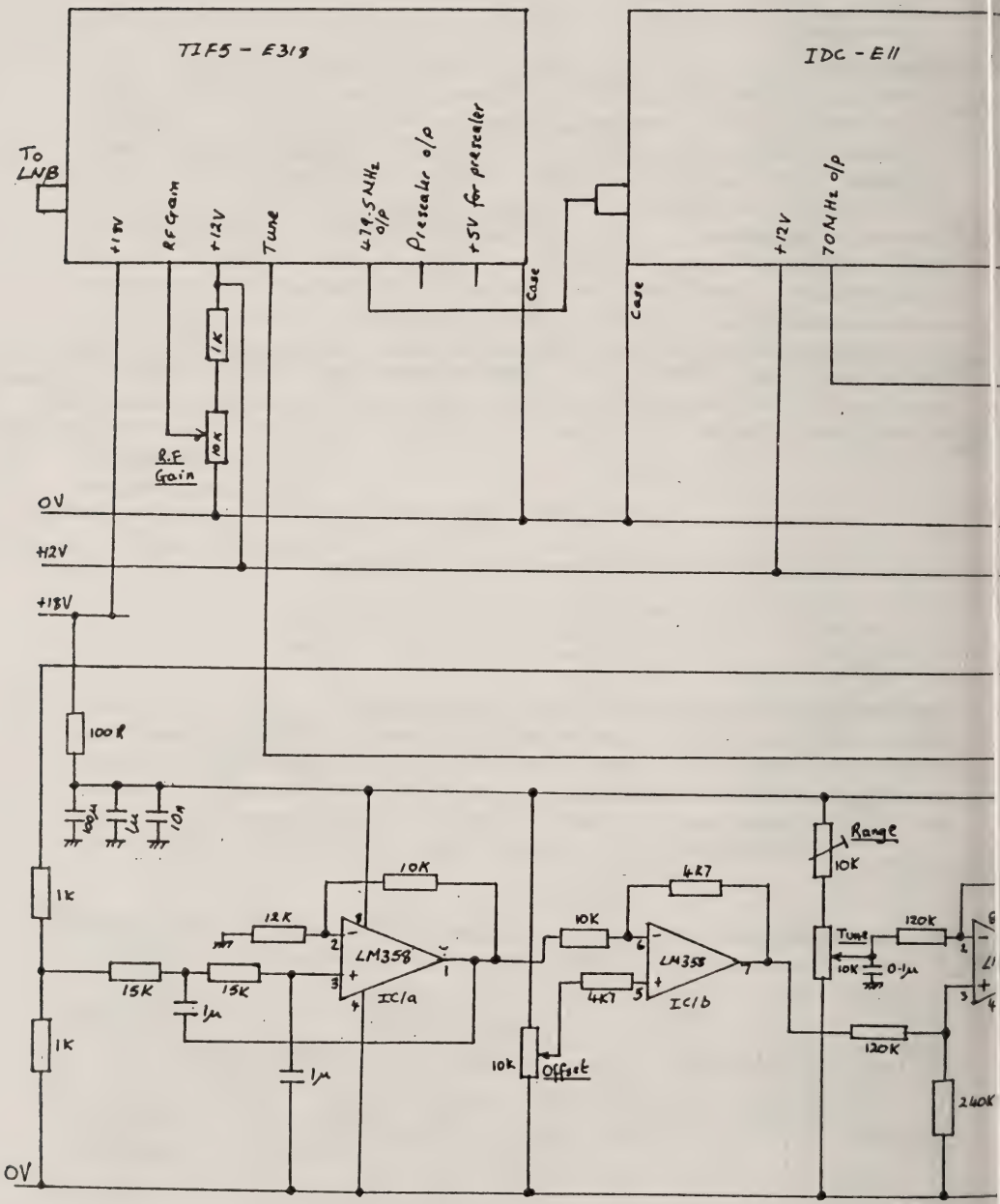
R

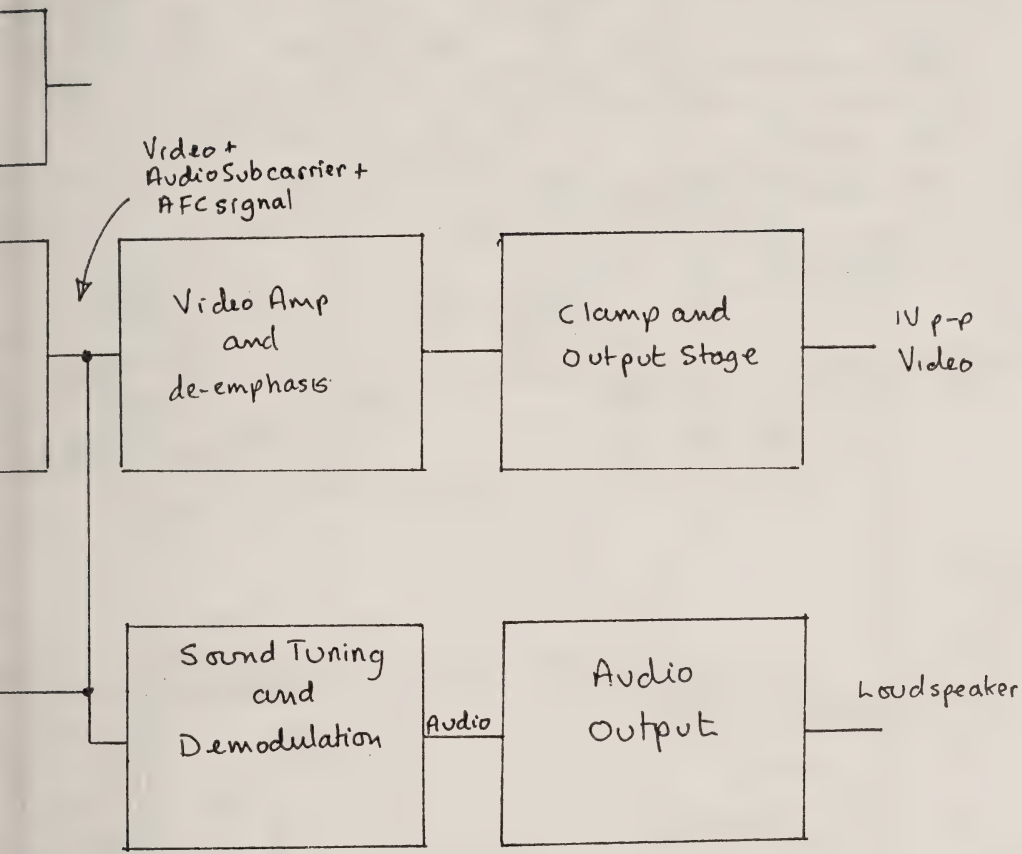


PROCESSING

RG Harris 1987

SATELLITE TV RECEIVER:
Tuner, AFC, Demodulation

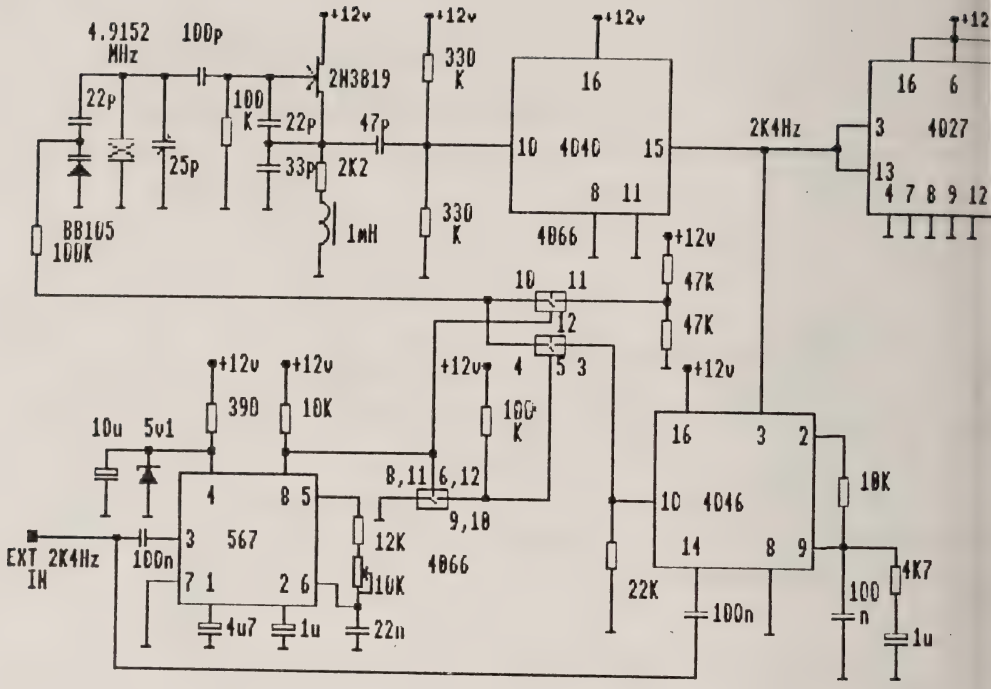




n Block Diagram

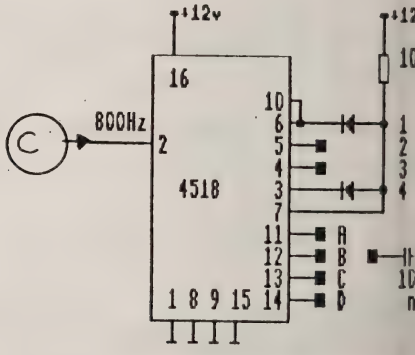
FOR

-ITE TV RECEIVER.



MOTOR DRIVE UNIT

GUY MARTIN.

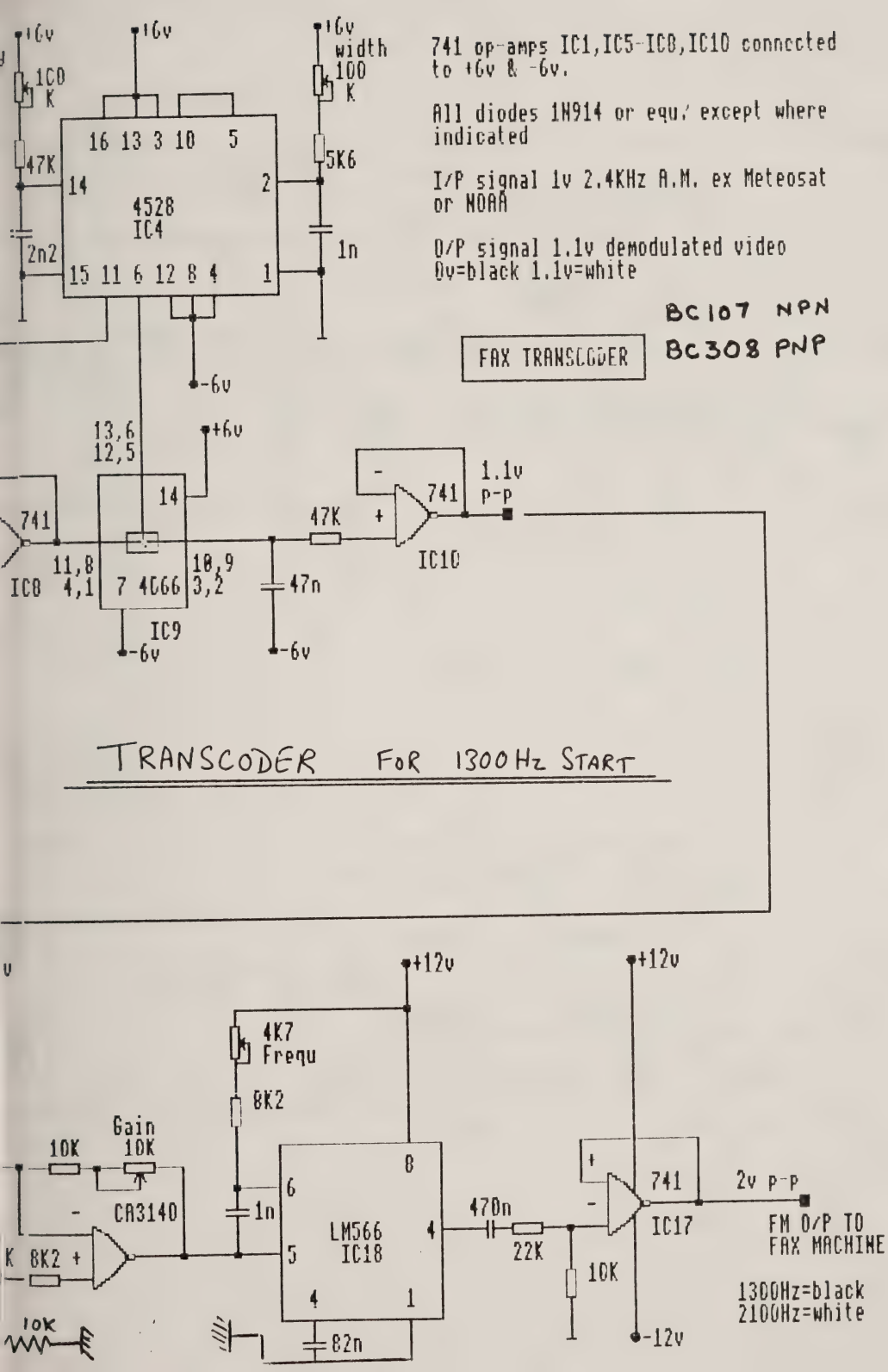


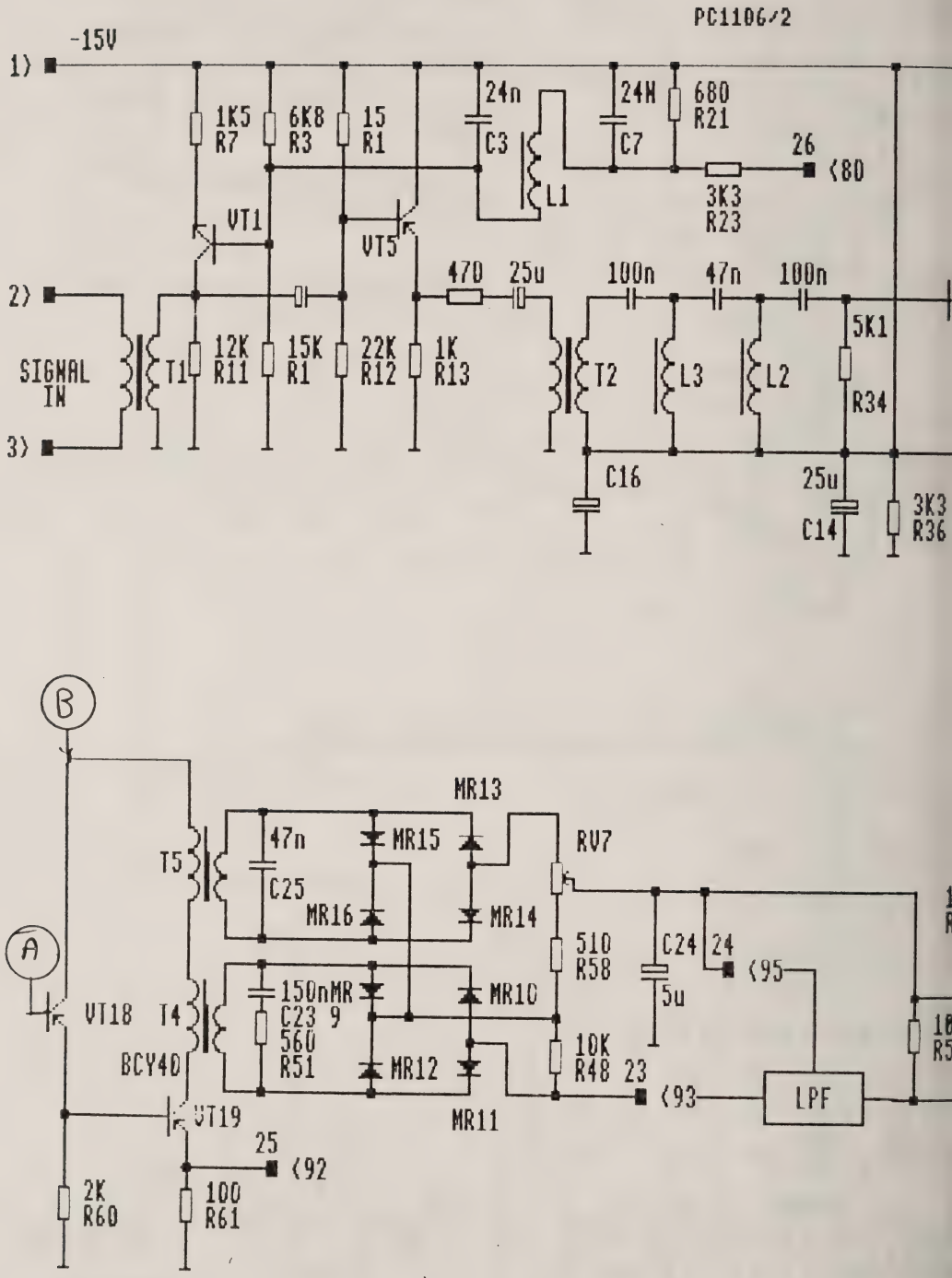
RPM	Fhz	DIV	4520H	4520o/p	Ca	Cb
120	33	72	184	C	5u	3u3
180	50	48	182	B	2u2	680
240	66	36	184	B	680n	470

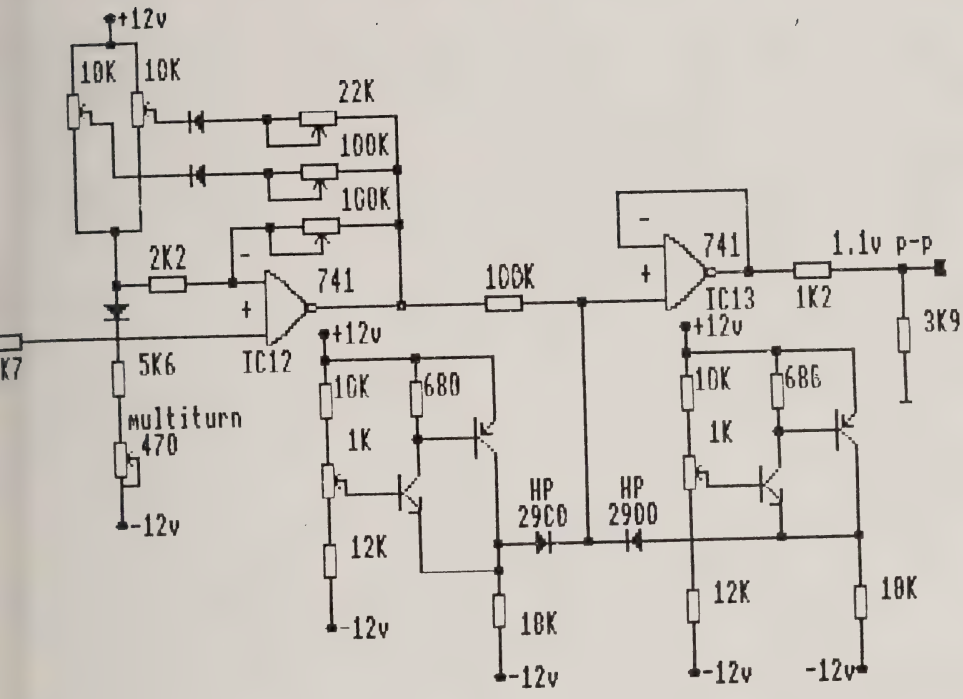
T1 240v IN/30-0-30 OUT ILP or C
T2 115v or 240v IN/25-0-25 OUT are s

T2 SHOULD BE A GOOD SIZE TO COPE WITH IRO

Motor Power 27W


741 op-amps IC1,IC5-IC8,IC10 connected to +6v & -6v.
All diodes 1N914 or equ. except where indicated
I/P signal 1v 2.4KHz A.M. ex Meteosat or NOAA
O/P signal 1.1v demodulated video 0v=black 1.1v=white
BC107 NPN
BC308 PNP
FAX TRANSCODER
+6v
-6v
width
100 K
100 K
47K
5K6
2n2
1n
4528
IC4
16 13 3 10 5
14
2
15 11 6 12 8 4
1
13,6
12,5
14
741
IC8
11,8
4,1
7 4066
10,9
3,2
IC9
47K
47n
741
IC10
1.1v
p-p
TRANSCODER FOR 1300Hz START
+12v
4K7
Frequ
8K2
Gain
10K
10K
CA3140
8K2
1n
LM566
IC18
8
6
5
4
1
82n
470n
22K
10K
741
IC17
2v p-p
FM O/P TO
FAX MACHINE
1300Hz=black
2100Hz=white
-12v


PC1106/2
-15V
1)
2)
3)
1K5
R7
6K8
R3
15
R1
24n
C3
L1
24N
C7
680
R21
26
<80
3K3
R23
VT1
VT5
470
25u
100n
47n
100n
SIGNAL
IN
T1
12K
R11
15K
R1
22K
R12
1K
R13
T2
L3
L2
5K1
R34
C16
25u
C14
3K3
R36
B
A
T5
47n
C25
MR15
MR16
MR14
MR13
RV7
510
R58
C24
24
<95
5u
VT18
T4
BCY40
150n
C23
560
R51
MR10
MR12
MR11
10K
R48
23
<93
LPF
VT19
25
<92
2K
R60
100
R61



PICTURE
PROCESSING
AMP.

NOAA '9' 137.62MHz, PERIOD 102.072991 MINS, INCR 25.5163352 DEG

1/01 181 03:39	30/01 355 15:21	2/03 346 14:47	1/04 186 04:11
1/01 334 13:51	31/01 353 15:10	3/03 190 04:24	1/04 339 14:24
2/01 331 13:40	1/02 350 14:59	3/03 343 14:36	2/04 184 04:00
3/01 354 15:11	2/02 347 14:48	4/03 187 04:13	2/04 337 14:13
4/01 351 15:00	3/02 344 14:37	4/03 340 14:25	3/04 181 03:50
5/01 348 14:49	4/02 188 04:14	5/03 185 04:02	3/04 334 14:02
6/01 345 14:38	4/02 341 14:26	5/03 338 14:14	4/04 331 13:51
7/01 189 04:15	5/02 186 04:03	6/03 182 03:51	5/04 354 15:22
7/01 343 14:27	5/02 339 14:15	6/03 335 14:03	6/04 351 15:11
8/01 187 04:04	6/02 183 03:52	7/03 332 13:52	7/04 348 15:00
8/01 340 14:16	6/02 336 14:04	8/03 355 15:23	8/04 346 14:49
9/01 184 03:53	7/02 333 13:53	9/03 352 15:12	9/04 190 04:26
9/01 337 14:05	8/02 330 13:42	10/03 349 15:01	9/04 343 14:38
10/01 181 03:42	9/02 353 15:13	11/03 347 14:50	10/04 187 04:15
10/01 334 13:54	10/02 350 15:02	12/03 344 14:39	10/04 340 14:27
11/01 331 13:43	11/02 348 14:51	13/03 188 04:16	11/04 184 04:04
12/01 354 15:15	12/02 345 14:40	13/03 341 14:28	11/04 337 14:16
13/01 351 15:04	13/02 189 04:17	14/03 185 04:05	12/04 181 03:53
14/01 349 14:53	13/02 342 14:30	14/03 338 14:17	12/04 334 14:05
15/01 346 14:42	14/02 186 04:06	15/03 182 03:54	13/04 332 13:54
16/01 190 04:18	14/02 339 14:19	15/03 335 14:06	14/04 354 15:25
16/01 343 14:31	15/02 183 03:55	16/03 333 13:55	15/04 352 15:14
17/01 187 04:07	15/02 337 14:08	17/03 330 13:44	16/04 349 15:03
17/01 340 14:20	16/02 181 03:44	17/03 355 15:26	17/04 346 14:52
18/01 184 03:56	16/02 334 13:57	18/03 353 15:16	18/04 190 04:29
18/01 338 14:09	17/02 331 13:46	19/03 350 15:05	18/04 343 14:41
19/01 182 03:45	18/02 354 15:17	20/03 347 14:54	19/04 187 04:18
19/01 335 13:58	19/02 351 15:06	21/03 344 14:43	19/04 341 14:30
20/01 332 13:47	20/02 348 14:55	22/03 189 04:19	20/04 185 04:07
21/01 355 15:18	21/02 345 14:44	22/03 342 14:32	20/04 338 14:19
22/01 352 15:07	22/02 190 04:20	23/03 186 04:08	21/04 182 03:56
23/01 349 14:56	22/02 343 14:33	23/03 339 14:21	21/04 335 14:08
24/01 346 14:45	23/02 187 04:09	24/03 183 03:57	22/04 332 13:58
25/01 344 14:34	23/02 340 14:22	24/03 336 14:10	23/04 355 15:29
26/01 188 04:11	24/02 184 03:58	25/03 333 13:59	24/04 352 15:18
26/01 341 14:23	24/02 337 14:11	26/03 331 13:48	25/04 349 15:07
27/01 185 04:00	25/02 181 03:47	27/03 353 15:19	26/04 347 14:56
27/01 338 14:12	25/02 334 14:00	28/03 350 15:08	27/04 344 14:45
28/01 182 03:49	26/02 332 13:49	29/03 348 14:57	28/04 188 04:21
28/01 335 14:01	27/02 354 15:20	30/03 345 14:46	28/04 341 14:34
29/01 333 13:50	28/02 352 15:09	31/03 189 04:22	29/04 185 04:10
30/01 330 13:39	1/03 349 14:58	31/03 342 14:35	29/04 338 14:23

All morning passes are southbound, all evening passes are northbound.

We have included some evening passes, which are about overhead UK.

14 FEBRUARY 1987

RIG SUBSCRIPTION 1988

Your subscription to the REMOTE IMAGING GROUP now falls due for renewal.

If you wish to continue to be a member of the group and receive the newsletter then please complete the form below not forgetting to sign the declaration and send it to Des Watson our membership secretary whose address is below.

The fees for 1988 are as follows:

UK membership		£4.00
European membership	(£4.00 + £1.00 post)	£5.00
Outside Europe	(£4.00 + £2.00 post)	£6.00

(All non UK post will be sent by air mail)

Send your completed form (including the completed survey) to:

Mr. Des Watson, SUBS 88
Norton,
Gote Lane,
Ringmer,
Near Lewes,
East Sussex, BN8 5HX
ENGLAND

NAME: _____ CALL SIGN _____

ADDRESS: _____

_____

_____ POST CODE _____

DECLARATION:

I do not object to the Remote Imaging Group holding my membership details on a computer.

Signed _____ Date _____

When writing in to the group please use your callsign if you have one. Finally if you have recently paid your 1988 sub then please disregard this notice.

MEMBERSHIP SURVEY

In order to understand what the members of the RIG are currently interested in we have compiled the questions below which we hope all members renewing their subscriptionwill complete. Please feel free to add any futher comments or suggestions on the reverse side of the survey form:

Yes/No

1 Are you currently receiving weather satellite signals? ___

2 Are you receiving polar orbiters, NOAA's Meteor's etc ? ___

3 Are you receiving Meteosat II ? ___

4 Are you professionally involved:

in education ? ___

equipment manufacturer ? ___

professional user ? ___

other, please specify overleaf ___

5 What display equipment do you use: Photographic fax ? ___

normal fax ? ___

micro computer ? ___

YU3 framestore ? ___

6 Do you use a micro computer for weather satellite work? ___

Which one?: BBC micro ___ Sinclair Spectrum ___

IBM PC ___ Apple ___

State model Commodore ___ Atari ___

please Nimbus ___ Other please specify

_____

7 For UK members only

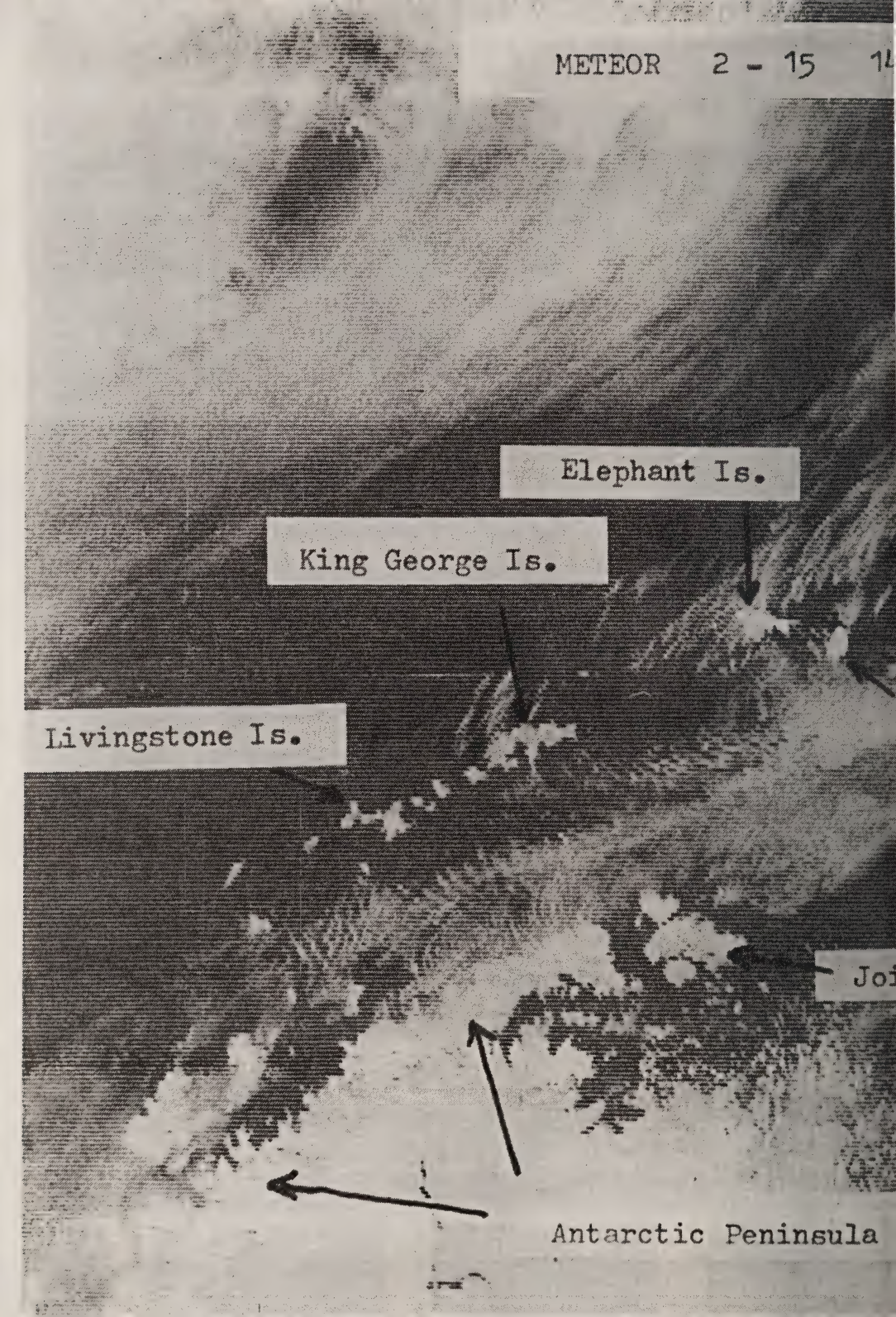
Do you object to your name and address details

a) being held on a computer? ___

b) being given to the DTI for blanket licencing approval ___

c) being given to RIG members in your vicinity ___

Do you suffer from the interference described in the editorial ? Expand if necessary overleaf. ___

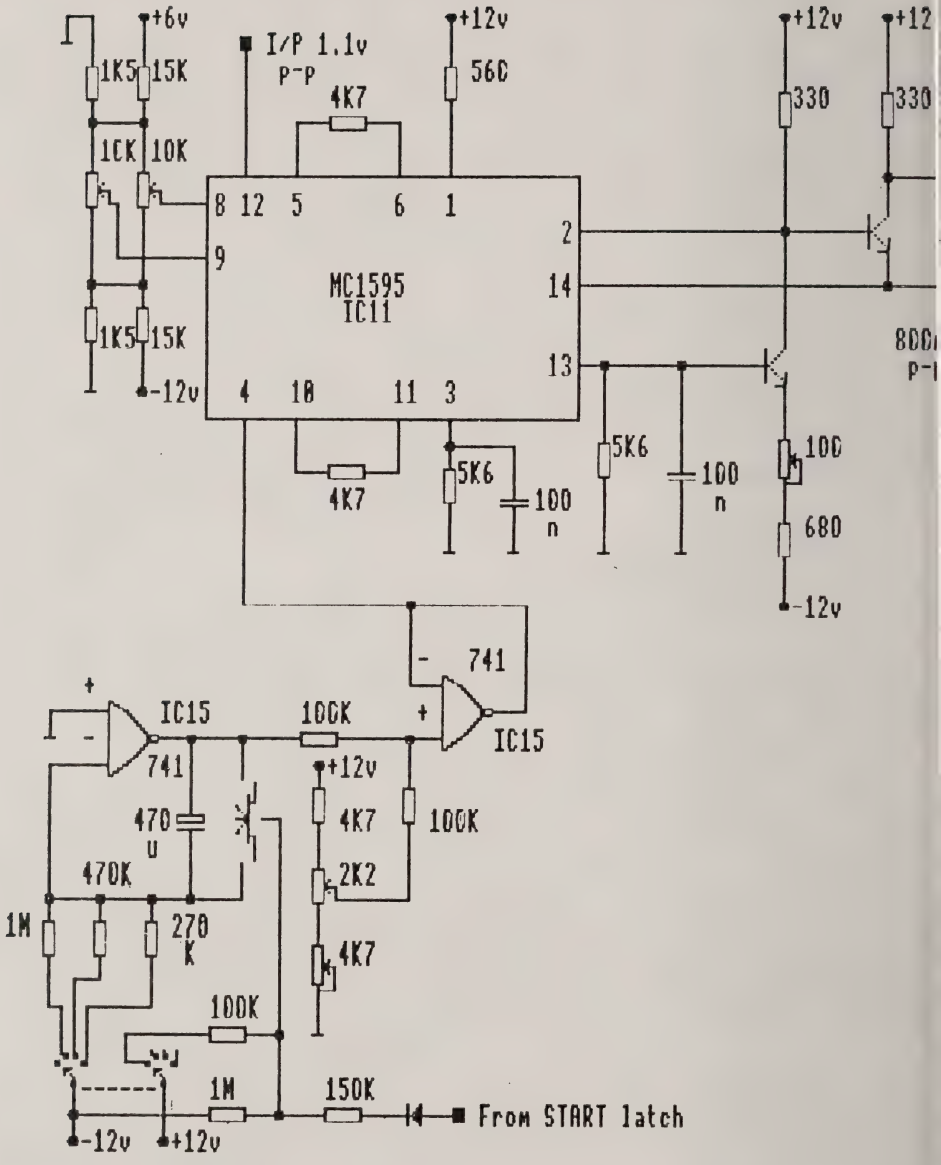

METEOR 2 - 15 14
Elephant Is.
King George Is.
Livingstone Is.
Joi
Antarctic Peninsula

NOAA '10' 137.50MHz PERIOD 101.285246 MINS, INC 25.3212425 DEG

1/01 188 08:11	30/01 181 07:41	28/02 198 08:52	30/03 185 07:59
1/01 340 18:19	31/01 175 07:19	1/03 193 08:30	31/03 180 07:37
2/01 183 07:49	1/02 195 08:38	1/03 345 18:37	1/04 174 07:15
3/01 177 07:27	1/02 347 18:46	2/03 187 08:08	1/04 199 08:57
4/01 172 07:05	2/02 189 08:16	3/03 182 07:46	2/04 194 08:35
4/01 197 08:47	2/02 341 18:24	4/03 176 07:24	2/04 346 18:42
5/01 192 08:25	3/02 184 07:54	5/03 196 08:43	3/04 188 08:13
5/01 343 18:32	4/02 178 07:32	6/03 191 08:21	3/04 340 18:20
6/01 186 08:03	5/02 173 07:10	6/03 342 18:29	4/04 183 07:51
7/01 180 07:41	5/02 198 08:51	7/03 185 07:59	5/04 177 07:29
8/01 175 07:19	6/02 193 08:29	8/03 180 07:37	6/04 172 07:07
9/01 195 08:38	6/02 345 18:37	9/03 174 07:15	6/04 197 08:48
9/01 347 18:46	7/02 187 08:07	9/03 199 08:56	7/04 192 08:26
10/01 189 08:16	8/02 182 07:45	10/03 194 08:34	7/04 344 18:33
10/01 341 18:24	9/02 176 07:23	10/03 346 18:42	8/04 186 08:04
11/01 184 07:54	10/02 196 08:43	11/03 188 08:12	9/04 181 07:42
12/01 178 07:32	11/02 190 08:21	11/03 340 18:20	10/04 175 07:20
13/01 173 07:10	11/02 342 18:28	12/03 183 07:50	11/04 195 08:39
13/01 198 08:51	12/02 185 07:59	13/03 177 07:28	11/04 347 18:47
14/01 193 08:29	13/02 179 07:37	14/03 172 07:06	12/04 189 08:17
14/01 345 18:37	14/02 174 07:15	14/03 197 08:48	12/04 341 18:25
15/01 187 08:07	14/02 199 08:56	15/03 192 08:26	13/04 184 07:55
16/01 182 07:45	15/02 194 08:34	15/03 344 18:33	14/04 178 07:33
17/01 176 07:23	15/02 346 18:42	16/03 186 08:04	15/04 173 07:11
18/01 196 08:42	16/02 188 08:12	17/03 181 07:41	15/04 198 08:52
19/01 190 08:20	16/02 340 18:20	18/03 175 07:19	16/04 193 08:30
19/01 342 18:28	17/02 183 07:50	19/03 195 08:39	16/04 345 18:38
20/01 185 07:58	18/02 177 07:28	19/03 347 18:46	17/04 187 08:08
21/01 179 07:36	19/02 172 07:06	20/03 189 08:17	18/04 182 07:46
22/01 174 07:14	19/02 197 08:47	20/03 341 18:24	19/04 176 07:24
22/01 199 08:56	20/02 192 08:25	21/03 184 07:55	20/04 196 08:44
23/01 194 08:34	20/02 344 18:33	22/03 178 07:33	21/04 191 08:22
23/01 346 18:41	21/02 186 08:03	23/03 173 07:11	21/04 343 18:29
24/01 188 08:12	22/02 181 07:41	23/03 198 08:52	22/04 185 08:00
24/01 340 18:19	23/02 175 07:19	24/03 193 08:30	23/04 180 07:38
25/01 183 07:50	24/02 195 08:38	24/03 345 18:38	24/04 174 07:16
26/01 177 07:28	24/02 347 18:46	25/03 187 08:08	24/04 199 08:57
27/01 172 07:06	25/02 189 08:16	26/03 182 07:46	25/04 194 08:35
27/01 197 08:47	25/02 341 18:24	27/03 176 07:24	25/04 346 18:43
28/01 192 08:25	26/02 184 07:54	28/03 196 08:43	26/04 188 08:13
28/01 343 18:33	27/02 178 07:32	29/03 191 08:21	26/04 340 18:21
29/01 186 08:03	28/02 173 07:10	29/03 342 18:29	27/04 183 07:51

All morning passes are southbound, all evening passes are northbound.

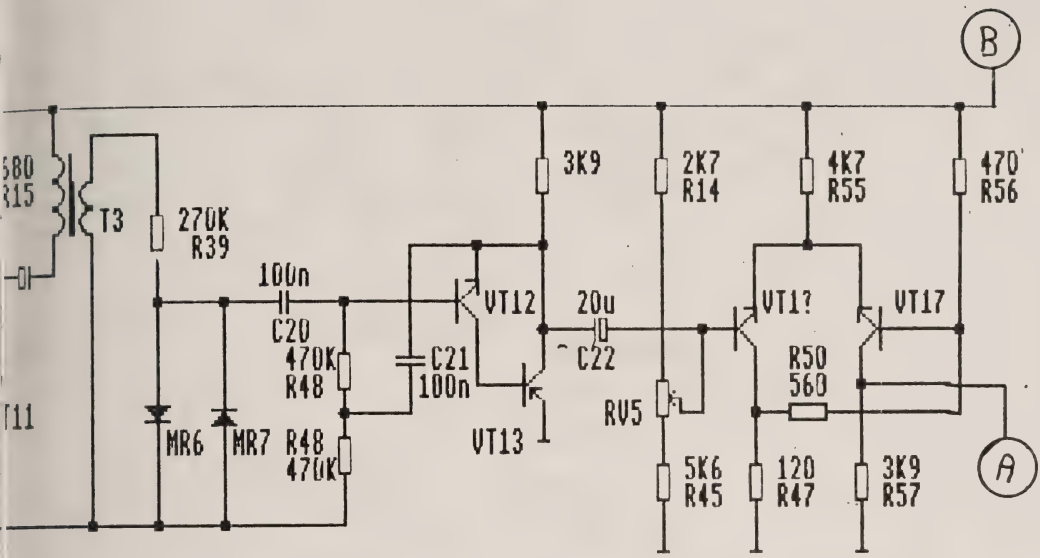
We have included some evening passes, which are about overhead UK.



741 op-amps IC14-IC17 connected to +12v & -12v.

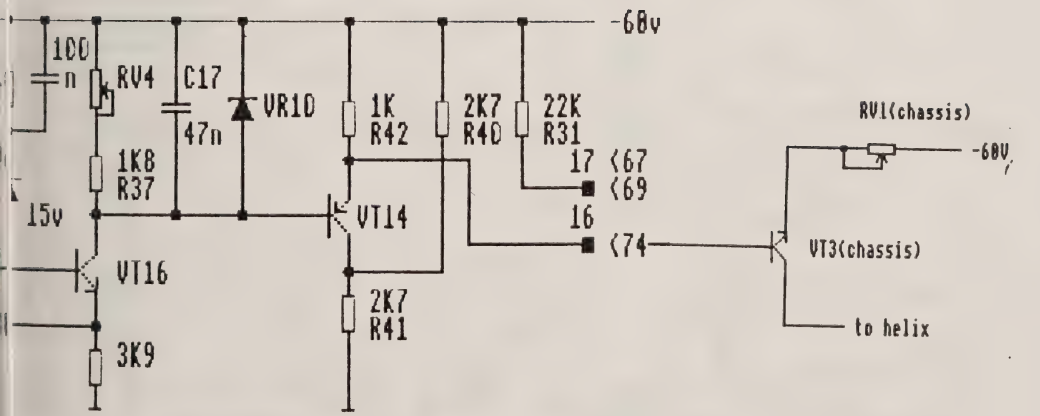
All unmarked diodes 1N914 or equiv.

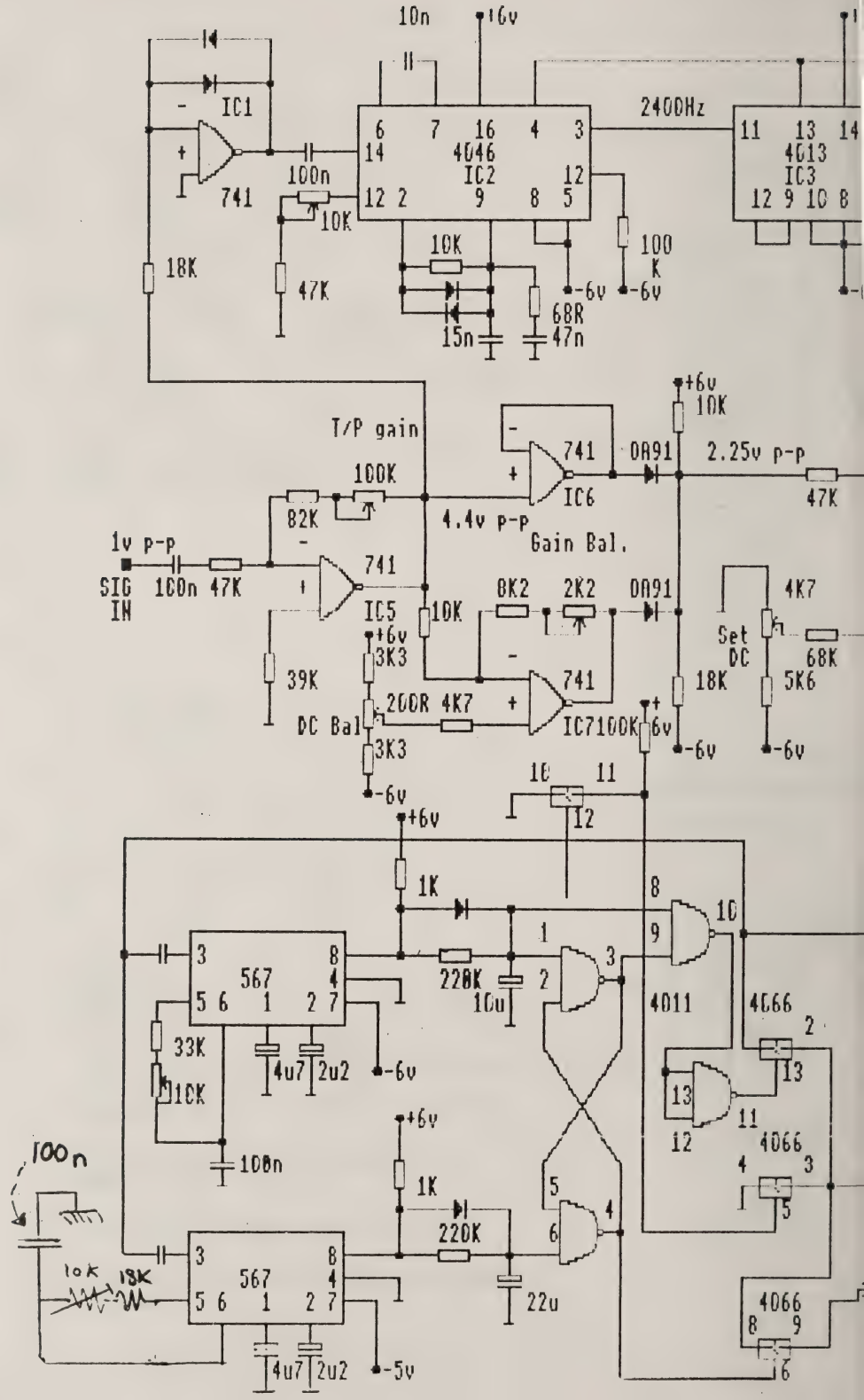
All transistors BC107(NPN) or BC238(PNP) or equiv.

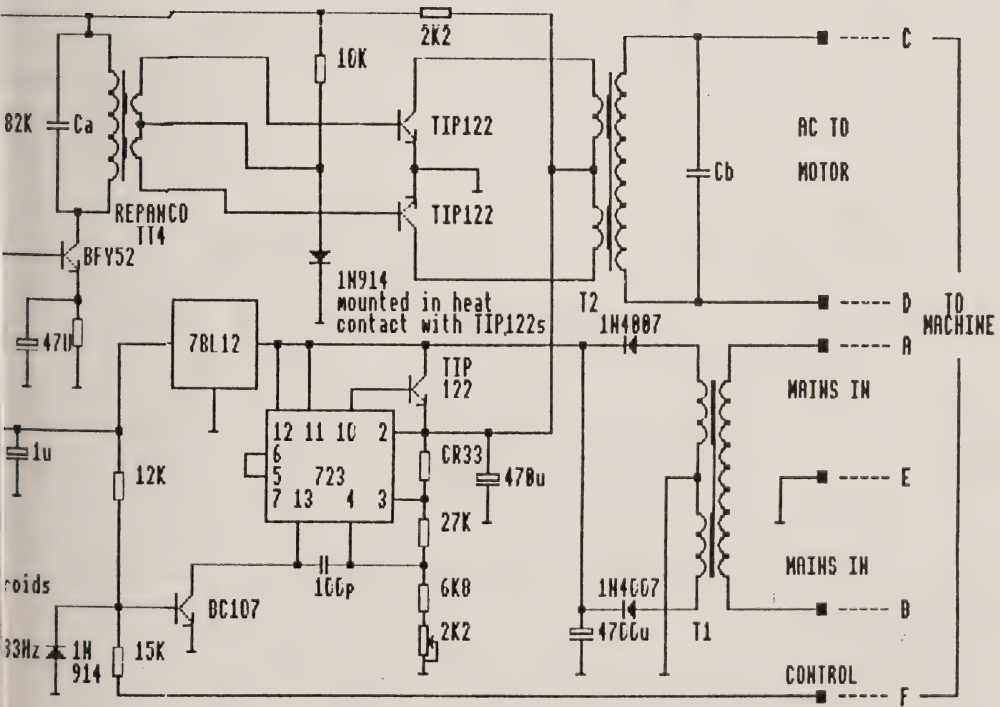


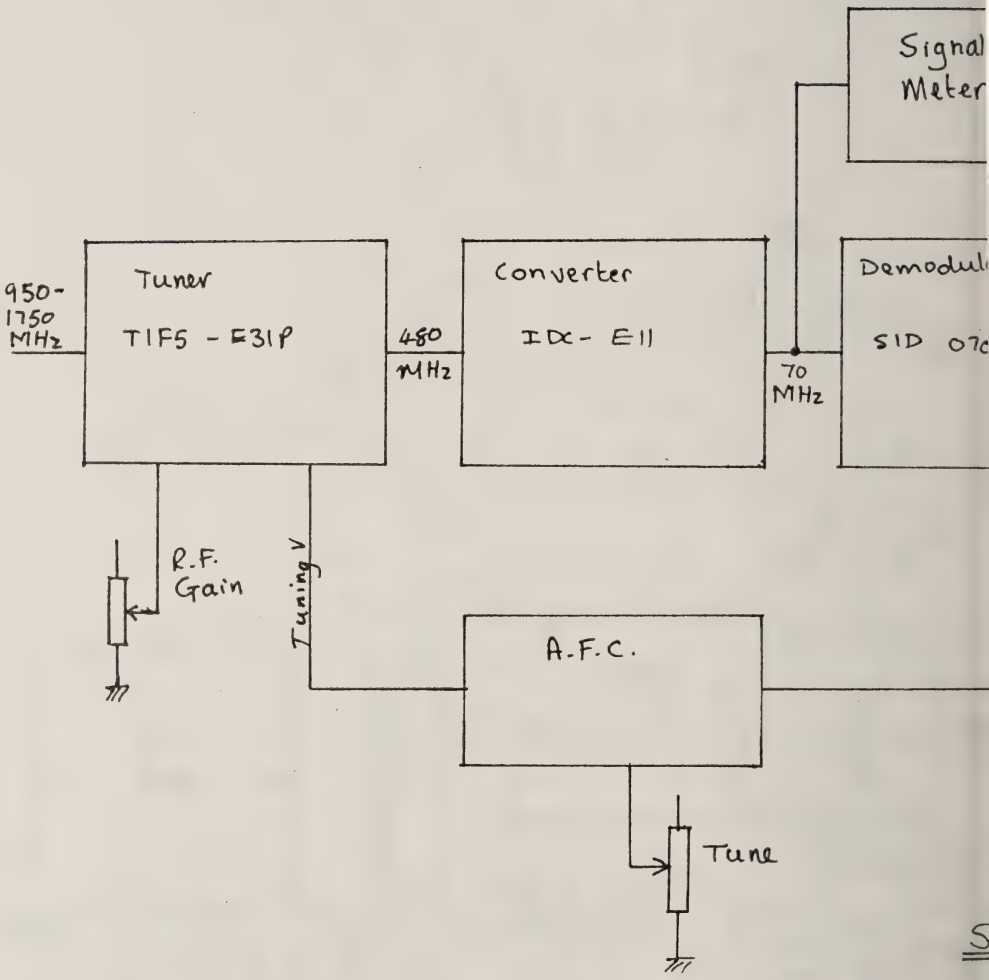
PC1185/2

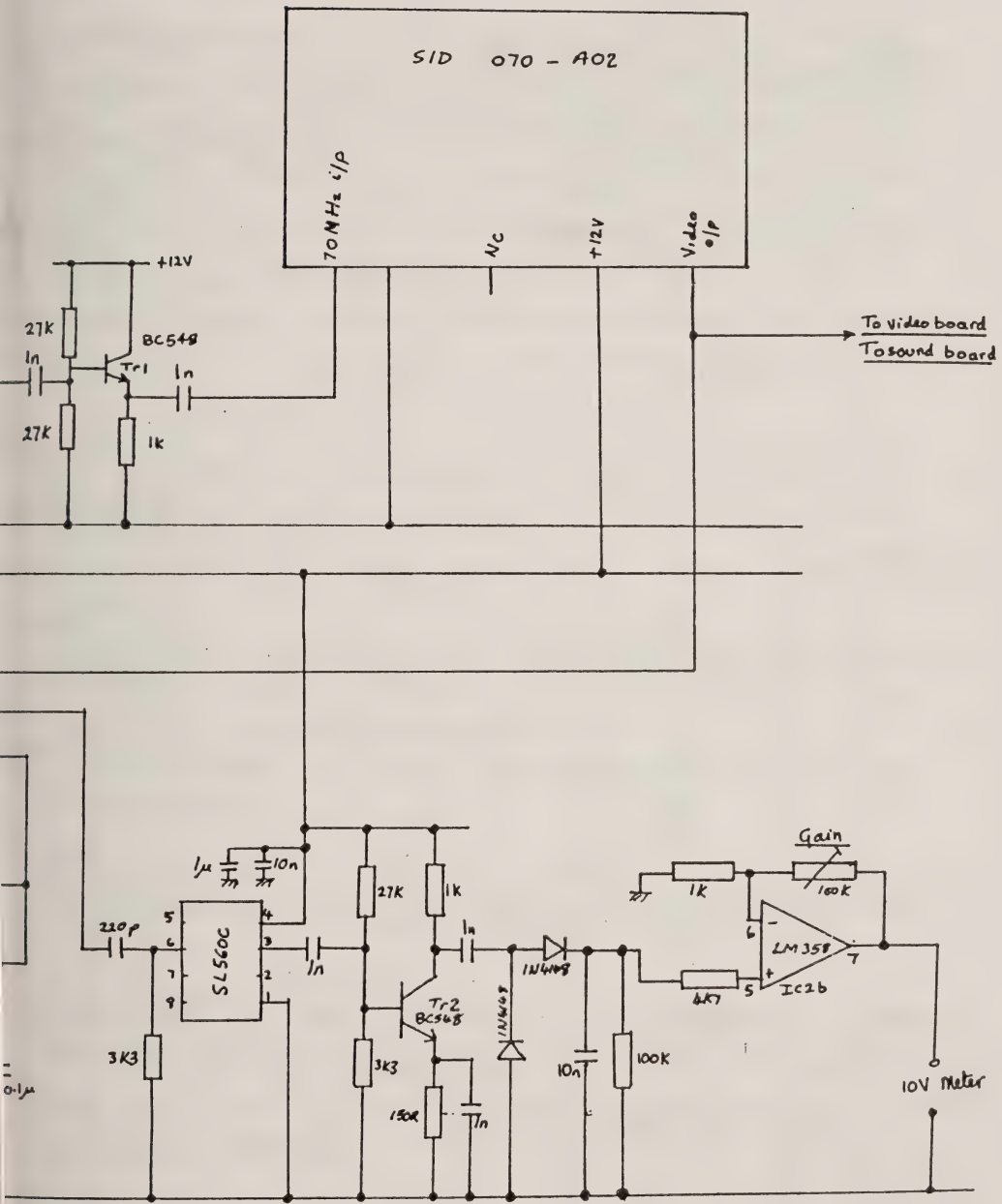
GUY MARTIN.



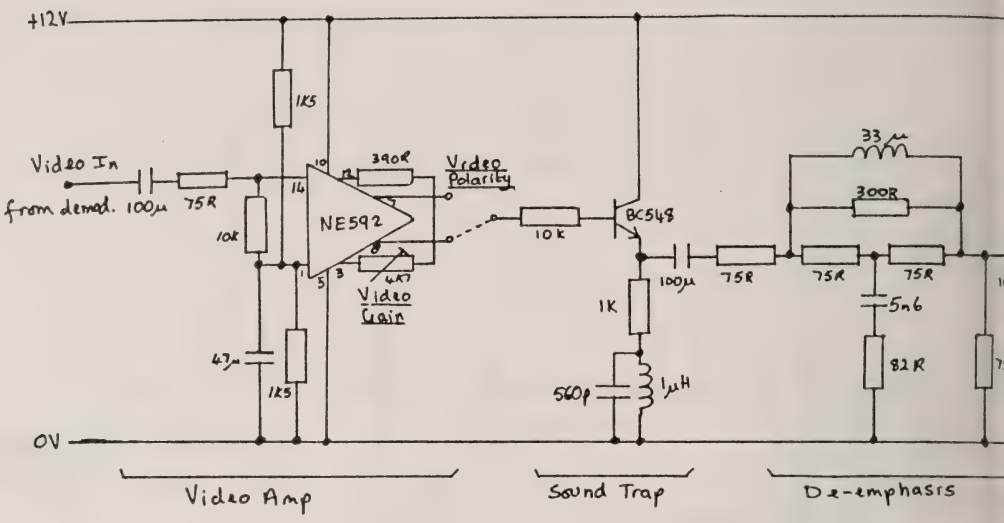

10n
+6v
IC1
741
100n
10K
18K
47K
4046
IC2
6 7 16 4 3
14
12 2 9 8 5
2400Hz
4013
IC3
11 13 14
12 9 10 8
10K
100 K
-6v
68R
47n
15n
T/P gain
100K
82K
741
IC6
0A91
2.25v p-p
47K
4.4v p-p
Gain Bal.
1v p-p
SIG IN
100n 47K
IC5
8K2
2K2
39K
3K3
200R 4K7
DC Bal
741
IC7
100K
Set DC
68K
4K7
5K6
18K
12
567
33K
10K
4u7 2u2
100n
220K
10u
4011
4066
1K
22u
10K
18K
-5v


2K2
10K
82K
Ca
TIP122
TIP122
REPANCO
TT4
BFY52
1N914
mounted in heat
contact with TIP122s
T2
Cb
AC TO
MOTOR
C
D
TO
MACHINE
1N4007
A
MAINS IN
78L12
TIP
122
1u
12K
12 11 10 2
6
5 723
7 13 4 3
CR33
470u
27K
E
MAINS IN
100p
6K8
BC107
1N4007
B
2K2
4700u
T1
33Hz
1N
914
15K
CONTROL
F


Signal
Meter
950-
1750
MHz
Tuner
TIF5 - E31P
480
MHz
Converter
IDC - E11
70
MHz
Demodul
SID 07
R.F.
Gain
Tuning V
A.F.C.
Tune



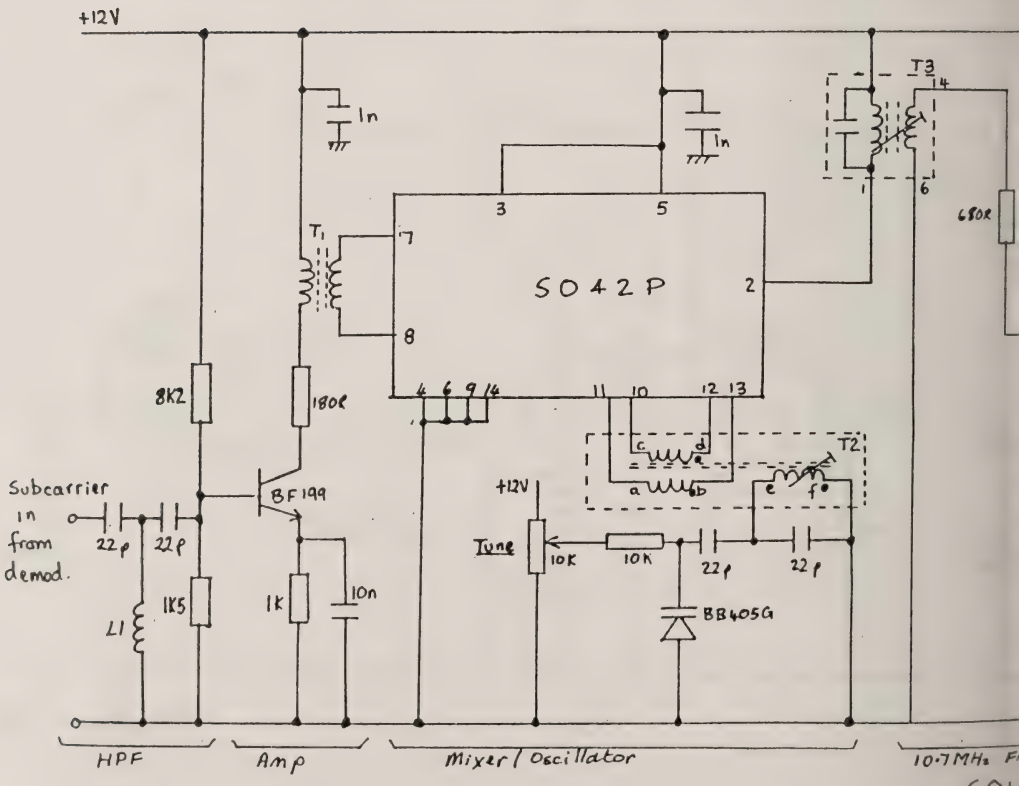
RG Harris 1987



VIDEO PR

FOR

SATELLITE TV



SOU

RUSSIAN SATELLITE CORNER by Les Currington

BE AWARE.....

Severe interference is being caused by a new Mercury data link. Since midsummer parts of Hertfordshire have suffered severe interference from a transmitter at Little Berkhamstead on 138.170 MHz. The 136-138 MHz band is effected at times completely blotting out any satellite transmissions. I have spoken to Mercury and the D.T.I. Mercury state that it is radiating square waves, and other transmitters are being installed across the country. James Brown in South Wales reports one in his area recently. Furthermore Angus McGugan up in Glasgow has got one up there reportedly on 138.08 Mhz. Please complain using the survey form.

The Russian satellite Scene at 30 11 87.

At the time of writing we are in a period of little soviet activity, only one meteor 2 series is currently transmitting over Europe and the Cosmos Oceanographic ones are only occasionally switched on over Europe.

Meteor 2-14 86-39A 137.85 MHz

By mid December 2-14 should be in a mid afternoon pass and possibly transmitting, at time of writing all passes are in darkness.

Meteor 2-15 87-1A 137.85 MHz
Excellent cloud cover pictures are being received on an ascending mid day pass.

Meteor 2-16 87-68A 137.4 MHz
No transmissions over Europe all passes are in complete darkness. Mid December should see a resumption of passes but possibly on 137.85 MHz

Meteor 30 80-05A 137.06 +/- 0.1 MHz
Transmissions have been reported on most days Peter Wakelin reports some good passes during mid November. See separate article.

STOP PRESS: Due to continuing local oscillator problems the frequency of Meteor 30 has drifted still lower. The frequency is now down to 137.00 MHz.

Cosmos 1766 86-55A 137.4 MHz
Several good transmissions have been reported during early November. James Brown reports an interesting one covering the Swiss Alps.

Cosmos 1869 87-62A 137.4 MHz
During the first week in September visible with data only pictures were transmitted, after several days the quality improved and during the period 15th-19th September some very good pictures were received.
At the Space 87 Exhibition at Brighton it was announced that the 5 segment 12 metre long aerial had failed to deploy, also the aerial feed lines did not close. A new space craft to replace 1869 is hoped to be in orbit in early 1988.

In reply to the letter written by Lawrence Harris and printed in the last Rig Newsletter asking any information on Met 30, I thought the following would be of interest:

During 1980 Geoff Perry, Gerry Kennedy and myself were actively engaged in analysing pictures from Met 30 a large number of pictures were recorded and printed for future reference.

The following details may be of interest:

Scanning four channel Radiometer
Channel 2 0.6-0.7 pm even days
Channel 4 0.8-1.1 pm odd days
Swatt width 1800 Km
Resolution at Nadir 1 Km.
Frequency 137.15
Deviation 9.6 Ks
Linear Scan.

Between the data and sync phasing bars was inserted a wedge which increased in amplitude with solar illumination, untill switched off over North Africa.
It is possible that the wedge showed the illumination level and was used to control the modulation.
During 1981 the phasing bars were missing followed by intermittent data and loss of linearity. The picture shown was printed in 1981 on one of my first home brew Fax machines. The aspect ratio shown is incorrect resulting in a slight cramping of the picture.

Les.

KEPLER ELEMENTS provided by Mary Finean
EARTH SATELLITE RESEARCH UNIT, UNIVERSITY OF ASTON

	MET 3-1 137.85 MHz 85-100 A	MET 2-13 137.40 MHz 85-119 A	MET 30 137.06 MHz 80-051
EPOCH OF DATA	87322.16974277	87322.01214500	87322.10908368
ACCELERATION	0.00000043	0.00000006	0.00001184
REV NO	9957	9571	40517
INCLINATION	82.5461	82.5340	97.7198
R. A. NODE	283.7435	318.6626	48.5668
ECCENTRICITY	0.0019216	0.0017593	0.0042016
ARG OF PERIGEE	304.2822	116.9794	9.2014
MEAN ANOMALY	55.6485	243.3179	351.0054
MEAN MOTION	13.16933287	13.84031791	14.98140607
SEMI MAJOR AXIS	1.18780265	1.14910972	1.08988515

	COSMOS 1766 137.4 MHz 86-55 A	NOAA 9 137.62 MHz 84-123 A	NOAA 10 137.50 MHz 86-73 A
EPOCH OF DATA	87322.12872656	87327.09516121	87328.92232939
ACCELERATION	0.00000089	0.00000104	0.00000204
REV NO	7028	15173	6159
INCLINATION	82.5287	99.0720	98.7003
R. A. NODE	210.2725	294.2480	357.5756
ECCENTRICITY	0.0023846	0.0015825	0.0014813
ARG OF PERIGEE	170.8750	116.9892	102.8525
MEAN ANOMALY	189.2905	243.2896	257.4308
MEAN MOTION	14.73561461	14.11532857	14.22528472
SEMI MAJOR AXIS	1.10209929	1.13413548	1.12828734

	MET 2-15 137.85 MHz 87-001 A	MET 2-16 137.4 MHz 87-068 A	COSMOS 1869 137.4 Mhz 87-062 A
EPOCH OF DATA	87322.15705611	87321.44288995	87322.13209914
ACCELERATION	0.00000006	0.00000044	0.00000301
REV NO	4382	1263	1839
INCLINATION	82.4630	82.5546	82.5165
R. A. NODE	256.5158	317.2262	271.3072
ECCENTRICITY	0.0014757	0.0013294	0.0022463
ARG OF PERIGEE	77.7566	22.5164	245.6016
MEAN ANOMALY	282.5246	337.6578	114.2827
MEAN MOTION	13.83571235	13.83328511	14.73419638
SEMI MAJOR AXIS	1.14936438	1.14949907	1.10216994

MEMBERS LETTERS:

Dear Phil,

I was delighted to find a simple cure for the infamous RAM ROT published in the June Newsletter. I modified the tracks on the 001 PCB to implement Roger Barker's perfect solution and the psychedelic zebra patterns have finally been banished.

A tip for frame store owners is to use 10 turn pots for the black and white controls, together with multi-turn dial mechanisms. With these, and several other mods, I am now finding the main frustration of the frame store lies in not being able to store pictures digitally on disc and recall them quickly. Anybody who has seen the new Acorn Archimedes micro knows the answer. With a 640* 256 resolution at 256 colours, here is the image processor we have been waiting for.

For those like me who can not afford one, there are other cheaper possibilities. I have an Atari 1040ST and would like to use my 1 Meg of Ram to store an image digitized at max resolution, which could then be selectively passed to the frame store for display. The Atari's own graphics loose out at 320*200 with 16 colours, so fusing the frame store with the micro seems like a good plan. I have worked how to pass data to and from the Atari and the frame store via the ST printer port, and I shall be putting the theory into practice after Christmas. Incidentally, dose anybody know for sure how many levels of grey the NOAA series provide on APT? The NASA technical manuals say 12 bits, but does this also apply to APT?

Finally, we have now nearly completed our LED based rotating drum photographic printer, and can confirm that building one is not a task to be taken lightly! There is a real concoction of electronic and mechanical problems to solve. I will try to document the construction sometime, but pressure of work at the moment completely precludes such a mammoth task! In the meantime, if anybody wishes to pick my brains over the phone, the number is Horsham 68697 after 6pm.

Nicholas Kesteven, Weald School

Dear Phil,

I wish, through the 'letters to the RIG Newsletter' to thank the members of the 'HELP' and; yourself, for their instant response response to my help requests with my WXSAT station setup and a further special mention to thank 'WXSAT', Chris Hornby (G3RAK) for his patience to my many phone and mail enquiries and two personal visits I paid to him.

I was particularly pleased to read his 'book' "Weather Satellite Reception", which helped greatly, with a step by step understanding of the requirements for a WX station and what is achievable ('another RIG bible?).

I feel that I would not have got the station going without the aforementioned help, coming late into electronics, after retirement, as an aircraft ground engineer with British Airways.

I did obtain a 'letter of authority' from the Dept of Trade and Industry, before I purchased any parts for the project.

The station at present consists of:

1 WXSAT 6 channel Rx with 's' meter & remote tape recorder control
2 YU3UMV frame store withe 256k memory chips, socketed throughout
3 WXSAT crossed dipoles antenna at 14 feet QTH 110ft approx
4 14" colour monitor, perhaps a synthetic colour unit later
5 Second hand stereo tape recorder, remote controlled from the Rx.

I find some problems with the operation:-

The picture starts high on the screen making adjustment of the picture, seem 'late', is this peculiar to my setup?

Find difficulty in setting up greys, to get a readable picture on 'VIS' & 'IR', any suggestions?

Don't think this setup is up to unattended operation, due to the adjustments required, to correct the contrast and centre the picture on the screen.

Reading the FAX articles with interest, as this is a goal for future development.

I close with the thanks to RIG group for the newsletter and help and look forward to some good pics from 'out there'.

73's, Yours truly,

Phil, G4UFH.

Dear Phil,

I notice many comments in RIG about the difficulty in obtaining a truly circular polar diagram from crossed dipoles. The requirement for circularity is that each dipole should have equal power in phase quadrature. The phase quadrature is easy, simply connect one dipole to the main feeder and the other in parallel through a further quarter wave of feeder as specified in the literature. The equal power requirement is the difficulty and depends on the accurate match to each dipole which is almost impossible to achive. The problem is that the extra quarter wave of feeder acts as an impedance transformer and magnifies the slightest mismatch.

Consider the usual design of crossed dipoles A & B. The feed impedance of each dipole is 75 ohms and the feed is taken to dipole A with dipole B in parallel via a quarter wave of 75 ohm feeder to provide the necessary 90 degrees phase change. Two 75 ohms in parallel gives a feed impedance of 37.5 ohms and this is corrected by a 43 ohm quarter wave matching section to give 50 ohms for the main feeder. All would appear to be well but suppose, as is far more likely in practice that the feed impedance of each dipole is 60 ohms not the theoretical 75. The 75 ohm quarter wave phasing section will act as an impedance transformer and convert the 60 ohms impedance of dipole B into 94 ohms which will appear in parallel with the 60 ohms of dipole A. Although the parallel impedance of the two dipoles will not have changed significantly (94 ohms in parallel with 60 ohms is 36.6 ohms) still quite close to the previous 37.5 ohms and the overall match will be good, the unequal impedances will result in unequal power distribution to the two dipoles and circularity of polar diagram will not be achived. It should perhaps also be mentioned that the use of coax feeder into a balanced aerial system will compound the problems.

The answer as used by the writer, is to incorporate the aerial system into a mast head pre-amplifier thus avoiding the balance and impedance problems with a long feeder. Most designs of pre-amplifier have an unbalanced feed point tapped onto the input coil. this can be easily overcome by winding a one turn link onto the earthy end of the coil thus providing a balanced input. The dipoles should be mounted on insulators bolted to the pre-amp case in such a way that the feed point to dipole A can be connected to the input link with virtually no wire at all. Dipole B is then connected via a quarter wave (36cms at 137.5 MHz) of 75 ohm balanced twin cable mounted externally to the box. By this means both dipoles are forced to have equal power distribution together with a balanced, connection and circular polar diagram will be achieved.

B. Sykes, G2HCJ Past chairman of Jaybeam.

REVIEW OF THE MARTELEC MSR20 RECEIVER
by Peter Dobson

Having spent the best part of 12 months listening to polar satellite transmissions on my modified FRG9600 scanning receiver, and witnessing the excellent pictures of other members in the RIG newsletter, I finally decided that I had to have a go myself!

The simplest approach, I reckoned, was to build the YU3UMV frame store and use my modified FRG9600 as a signal source. As I already had a discone aerial this was pressed into service.

After many hair pulling evenings getting the frame store to function properly I was finally ready to view pictures-or so I thought! Predictably the "simplest" solution was not entirely satisfactory noisy pictures and the like, and it became apparent that a dedicated receiver with good sensitivity and optimised bandwidth, was required.

The Martelec MSR20 was selected as it claimed a very good performance at a modest price. Another requirement was that it should have a remote control for tape recorder.

The assembly was reasonably straight forward, and I'd sorted out the colour codes on some of those 1% resistors supplied. The assembly took a couple of evenings, and was greatly assisted by the blown up layout diagram, and step by step instructions supplied (other manufactures please note!).

One problem I encountered was that the spacing allowed for the six chokes associated with the electronic channel selection was too small, however on contacting Martelec I was advised that the board had originally been layed out for somewhat smaller choke which was no longer available, and that I should stand these on end to accommodate them. Another small criticism was that about four holes needed to be enlarged to accept the component. This done, I was finally ready to switch on and check out.

To my pleasant surprise I was greeted by the characteristic "hiss" from the speaker. The alignment procedure is quite straight forward if followed step by step, and involves no more than a multimeter if you tune up on a satellite signal. Fortunately I had a signal generator available to me and in any case could not wait for a satellite pass!

Pictures that I'm now getting are virtually noise free from North Africa to Greenland most days and the only modification was to change one capacitor value to increase the relay drop out delay time from the standard 2.5 sec. to nearer 5 sec.

Mounting the module into the case (I bought Martelecs hardware kit, which includes everything from a moulded mains lead, to the nuts and washers) is simplified by the use of miniature connectors from the board to the off-board components-another nice touch.

To summarise then, a relatively straight forward assembly job to produce an inexpensive receiver with a creditable performance.

Satellite TV Receiver based on Mitsumi modules.

by Bob Harris G4APV

This article describes the basis of a satellite TV receiver or indoor unit. I have been building satellite TV gear for some four years, initially on 4 GHz and more recently on 11 GHz. The circuit described represents part of my most recent system. It should provide a good basis for experimentation/building I claim little originality for the circuits, most having been "borrowed" from other sources in the first place, however they work.

System Description

The system is based on the Mitsumi modules available from Phil. It provides a 1v p-p video output to drive a monitor plus a loud speaker output for the audio. In practice I drive an ASTEC modulator to provide a conventional UHF output. I have left you to sort that bit out for yourself. AFC has been provided. This permits the use of a single turn pot for tuning, otherwise a less convenient and more expensive 5 or 10 turn type is needed.

Circuit Description AFC Circuit

The d.c. level at the output of the demodulator is directly related to the accuracy of the tuning. Correctly tuned in gives about 10v, if tuned to low this drops to about 9v maximum, or up to about 11v if tuned too high. This voltage is fed to IC1a which is a 2nd order low pass filter with a cut off of about 10Hz. This is designed to remove the 25Hz energy dispersal signal, plus the video signal. IC1b is set to provide about 10v out when not tuned to a signal. IC2a is used as a differential amplifier and combines the AFC signal with the tuning voltage. Note that the lower the voltage from the 'tune' potentiometer the higher the received frequency. The SL560C (same as an RS560C from RS components) amplifies the the 70MHz IF which is then rectified and amplified by IC2b to provide the signal meter drive. Tr1 is merely a buffer.

Video Processing

The NE592 is a video amplifier with adjustable gain and switchable output polarity. The sound trap prevents the 6.65 MHz sound subcarrier causing patterning on the picture. The de-emphsais network is needed to reduce the amplitude of the high frequency components of the signal. The video clamp removes the 25Hz energy which would otherwise cause flicker.

Sound Processing

After a high pass filter the subcarrier is coupled into the SO42P. This has a mixer/oscillator combination and up converts the nominal 6.65MHz subcarrier to a standard 10.7 MHz IF. after filtering by T3 and CF1 the signal is demodulated by a TBA120S quadrature demodulator. The LM380 audio amplifier chip provides the power to drive a loudspeaker.

Comments

1. The AFC is a bit of a job to set up, the 'offset' pot being critical, a stabilised +18v helps here.

2. Do not use a 741 or similar op-amp. Since the op amps are on a single power rail a common mode input voltage down to 0v is required. The LM358 provides this (I've found these to be handy little chips!)

3. The - 256 prescaler affects the signal meter, hence I have not yet used it.

4. The SID 070-A02 is a little narrow, I hope to try a better Plessey chip soon may give better results.

5. An AGC or RF gain control is needed as too much drive will cause a poorer signal.

6. I use a 1.7dB NF LNB on a 2m dish (home made and a bit rough!) and get good results with the circuits shown.

PARTS

Most are available from Cirkit
Mitsumi Modules - set of 3 for £65 inc available from Phil Seaford
SO42P , BB405G -Universal Semiconductor Devices.

Construction

I use a P.C.B with a ground plane plus tracks on the other side, however it all seemed to work when on a Veroboard with modules strung together via miniature coax cable.

Future

I have an experimental all 12v portable system based on a 6" monitor and a 12-18v switched mode psu for the LNB. More details when it is fully debugged.

Conclusion

Please try this. If you modify it, find better solutions e.t.c. then let us know. Finally I have a 2.0 dB (at worst) Echostar LNB for sale at £90.00 Ring me on Sheffield 363641 if interested.

Dear Phil,

I feel that I ought to write to you as my experiences, starting as a novice 12 months or so ago, and questions, in listening to weather satellites might be of interest to others.

My interest started in 1974 when an article was published in Wireless World by G R Kennedy concerned with receiving pictures from NOAA 2 and NOAA 3 (!!!). The display was a scope with a long persitence tube, and if anyone is interested I still have the articles. Since than I have also collected articles by Kennedy on a facsimile machine (WW December 1976) and receiving Meteosat (Christieson, WW June 1979). Latterly, articles have appeared in Pratical Wirless (which mentioned Rig) and in the Maplin Magazine (which didn't!).

It was joining RIG that fired me into actually building the frame store convertor and a receiver. As always I seemed to find a hole in the necessary information to complete the setup, namely a suitable aerial, until I discovered a suitable design in WW July 1972. This described a very simple crossed dipole with reflector, which was designed for 137.62 MHz (Mc/s in those days) and with the reflector spaced such as to give a flatter response. If you are interested I will send a copy of the design. I built the circuit receiver which operates very well without a pre-amp and pictures can be received from Algeria to north of Norway (I defy anyone to get much further north/south than that, as the satellites are then below the horizon as far as I am concerned at this location). I suppose like everyone I have noticed that the signal from a given satellite seems to vary in strength from day to day, which I have put down to the atmospheric conditions, or have I something wrong somewhere?

Whilst much has been written about the frame store, I have tried virtually every mod, except the multi picture designs, and feel well satisfied with the results. For predictions I use the "satpac" (available from Amsat) software running on a BBC computer, which provides data on the time when the satellite becomes visible, the elevation and azimuth etc. Its a good program, but I found, Like all "user friendly" software. became very tedious to run as I kept having to answer a repetitive series of questions, and the print out seemed to consume paper unnecessarily. I have customised it to take the tedium out of getting predictions. Unfortunately it can only be run when a satellite is not expected as the interference from the Beeb is horrendous. Anyone know a cure? I have tried kitchen foil on the inside of the case but that only gave a limited reduction. My Atrai ST on the other hand is very quiet, but there again a look inside gives a reason, as it is all cased in thin steel plate.

Whilst adding an "s" meter to the receiver I came across a very interesting fault which I have never seen before and which took sometime to cure. The "s" meter circuit was taken from Rig No2 and built on veroboard into the Rx case. Unfortunately all it gave was 50% signal strength with no signal. The trusty scope across the meter showed that the whole system was oscillating at 300 KHz. That frequency happens to be the final IF frequency of the Rx but the oscillation persisted with the Rx off. Anyway to cut a long story short,I finally discovered that the problem was due to two vero tracks next to each other and carrying the input and output signals causing feedback. Deft use of the spot face cutter to isolate the "spare" lengths of tracks so that the signals were no longer next to each other for such a long distance cured the problem.

Getting good results from Meteor satellites has been a problem for me, although I am feeding an external 2400Hz sync signal into a frame store. My recorded results never sync properly and the edge of the picture wanders randomly and slowly across the screen. I can only assume that at the time of making the recording I must lay down a 2400Hz sync channel (OK if you use a stero tape recorder) and use that as the sync input. I can't use the frame store and the receiver at the same time, due to noise produced by it when receiving weak signals, so I have not been able to check on a live signal if my theory is right. Am I right?

So what next? Well, Meteosat seems to have certain attractions as I don't have to wait for it to appear over the horizon. I guess that like many people the idea of 1.7 Ghz receiver construction is a bit daunting, due to the test gear required to set it up, which is out of my league. However I noted that the T.V. satellite modules that you advertised in RIG 9 cover the required frequency so are we not that far away from finding a cheaper solution or are we? (Ed replies: The Mitsumi modules are entirely unsatisfactory for Meteosat due the bandwidth required for Satellite tv, at least 27 MHz which would get both Meteosat channels at the same time!)

Since starting this letter I have become a proud owner of one of Brian Week's K401-D Fax machines, which were advertised in last month's Rig magazine. Now I have a real reason for writing, and that is to advertise for a service manual or at least a circuit diagram for this very interesting machine. Do any of the members have one as I am sure all Brian's buyers are going to be in the same boat as me? If someone can loan one to me I will of course re imburse the owner any postage etc. The telephone number is 021-744-4879.

Incidentally whilst on the subject of Fax machines, Muirhead have sold most of their interests, including the paper distributions, which is now available from Alfax Paper UK LTD, Epsom, Surry, phone 03727-41062 at £40.50 a box of 6 rolls. As it has a six month shelf life and each roll is 200 ft long then 6 rolls is a bit much. However I was offered 2 rolls for £21.85 inc. vat and carriage.

Dear Phil

The following notes may be of use to any members having the same problem that I recently had with my frame store. After over a year of successful operation, my YU3UMV frame store developed a fault. The image became blurred or smeared, leading to loss of detail. The initial switch on pattern was still sharp, and the picture was still clocked into and out of memory ok. the poor quality persisted even on "live" pictures straight from the Rx, indicating that the fault was not in the cassette recorder. Cliff, G6HVZ brought his oscilloscope round and confirmed that the memory board was working perfectly. Cliff finally tracked the fault down to I105, a CD4007, which apperaed to be faulty. Swapping the chip with I122, another CD4007 in the 1 MHz. Oscillator caused the board to stop working altogether. and a new chip solved the problem. My framestore is now working as it should and producing excellent pictures from NOAA and Meteor.

Nick Quinn, GOBAF

More notes from the Secretary:

Dallas Remote Imaging Group - DRIG

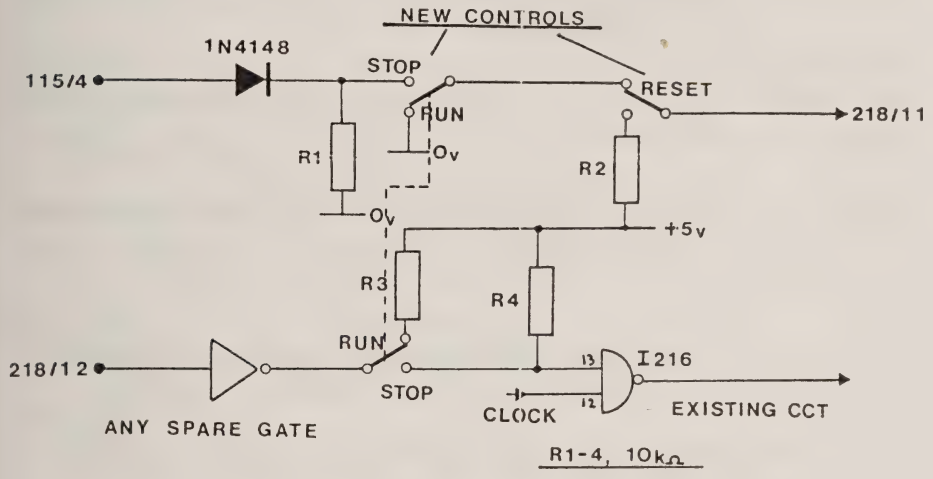
I've received a letter from Jeff Wallach, Chairman of DRIG, that offers gratis membership to all RIG members. The DRIG has almost identical interests to our group but with much closer ties with NOAA/NESDIS. They do not publish a newsletter as yet but have a bulletin board service to which free access is granted to all RIG members. The DATALINK service operates 24 Hours a day and can be accessed by any ASCII terminal or personal computer with a 300 bps or 1200 bps modem. The number is 0101 214 394 7438. One of our UK members is already regularly accessing the service and passing info on to me. Jeff's closely involved with IBM equipment and I look forward to exchanging articles with him as I use Wordstar on an IBM to prepare the newsletter. Watch this space.
Naturally Jeff has been signed up as a permanent RIG member.

FOUR PAGE MEMORY PICTURE POSITIONING CIRCUIT

The circuit was evolved from a requirement to quickly set up the memories when the YU3UMV Framestore was being used by students to show a film sequence. The circuits operation relies upon two existing Framestore features :-

1) The ability (I 113) to detect the 'meteosat'. Page start tone.

2) The fact that the line counter (I 218) does not stop counting when 255 is reached. Pin 12 going high on the count reaching 256.



The circuit was constructed on a spare corner of the stripboard containing the 4 page counter circuit (G4RAK, issue no. 4) constructed is really a misnomer as the mod largely consists of wiring changes.

The only real element of note is the change to I 216 which in the original circuit is strapped as an invertor, pins 12 and 13 connected, but which in this circuit takes on it's real function as a NAND gate. To implement the mod is easy, as the connection to pin 12 (existing circuitry) is on the top of the PCB and the link (which must be cut) is on the bottom of the PCB, the new wiring going directly to pin 13 on the IC.

In operation the switch is set to page stop and memory page 0 selected, upon receipt of the start tone the memories are reset and upon ceasation of the start tone the picture scrolls, when the store is full ie 256 lines, I 216 is disabled and the scroling stops. A new page can be selected and any frame recorded will be held in the same relative postion in memory.

As I 216 is held disabled by the output from I 218 it follows that when I 218 is reset, I 216 will enable and the scroll clock will increment I 218 again.

To resume normal operation the switch page stop/run is put in the run position. The reset button is used to correct the frame position for film purposes in the expanded picture mode.

RIG Shop Corner

Meteosat Downconverter - Fully described in RIG 8:-

a). Assembled and tested module in tin plate box:-
£129.69 + £1.00 p&p.

b). Complete mounted in weather proof box:-
£157.96 + £2.00 p&p.
Waterproof power and channel change connector £10.00 extra if required.

The RIG Receiver module is proving to be very popular with members and is still available from the secretary. The full specification was printed in RIG 5, but briefly the spec. is:

136 - 138 MHz Scanning receiver module
Sensitivity 0.2uV for 12 db SINAD at 10 kHz deviation
IF bandwidth 50 kHz
Audio tailoring specically designed for weather sats.

Built and aligned PCB together with
LED channel display module, Molex PCB connectors
and optionally, a full frequency LCD readout.

Basic module with channel display	£99.75
as above with additional LCD frequency display	£138.77

Prices includes packing and recorded delivery.
Cheques for above items payable to "DARTCOM".

The RIG VHF preamp also available includes a bandpass filter and is ideal for masthead mounting. The spec. was printed in RIG 7. It is available from the secretary as a built and aligned PCB measuring 85mm by 33mm (3 5/16 x 1 15/16 inches).

Module including first class post £13.37

Other items available by post:

A-D module for complete control of grey levels on the framestore £18.86

Cheques payable to "Remote Imaging Group" please

Anybody requiring PCBs should contact the secretary, G8XTW.

WHERE TO OBTAIN A RIG DISH and FEED HORN:

The RIG has had specially made, some 1 metre spun aluminium dishes and some compatible horn feed assemblies. These are intended to form the basis of an aerial system to receive signals form Meteosat II.

The cost of the dishes and feed horns has been kept to an absolute minimum. So they will not be available by any form of carriage as packing such an item would be impractical. So UK members only, sorry. They are only available to members who may only collect them from the despatch points below or from rallies we attend in the future.

When using the despatch points please use the telephone numbers given to reserve your dish and when collecting please pay by cheque payable to the "Remote Imaging Group".

1 Metre Spun aluminium dish for Meteosat	£34.00
Tubular feed horn with tripod mount for dish above	£33.73

Bedfordshire

The Editor/secretary, see front cover

Oxfordshire

Dermot, G8SIN, Tel. 0865 61797
22 Ramsey Road, Headington, Oxford.

Lincolnshire

Henry, G3REH, Chairman, see front cover

Devon

Dave, G4XOU, Tel 0822 613343
15 Milton Crescent, Down Park, Tavistock, Devon.

Sussex

Des, Membership Sec. Tel. 0273 813103

Manchester

Mike (J.M.) Horrocks G8GTP, Tel 061 766 6269
"Fairview", 17 Wood Grove, Whitefield, Manchester.

Hertfordshire

Les, G8LOK, see front cover

A mounting for the dish is also available but only at rallies or by collection from the secretary.

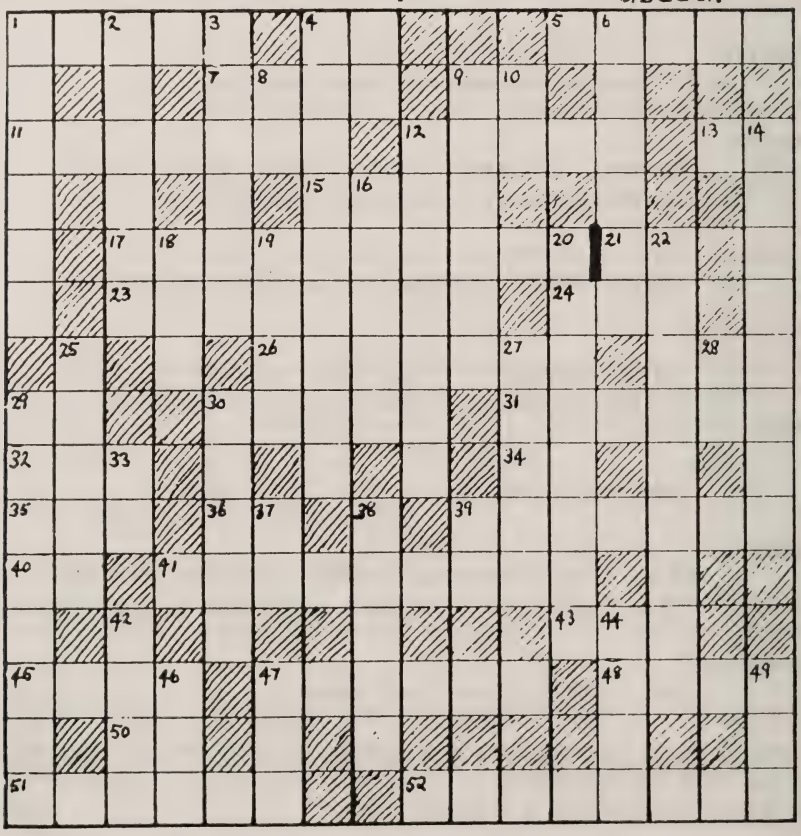
3 Point mount for dish to a vertical pole	£22.00

CHRISTMAS CROSSWORD

CLUES ACROSS

1.WHITE AND FLUFFY.
4.COMMANDING OFFICER.
5.MATHEMATICAL DIFFERANCE.
7.PLENTIFUL ORE.
9.YOU HAVE POWER WITH THIS.
11.QUICK SHINE.
12.TOOL OF TRADE FOR MR FISH.
13.VERY IMPORTANT ELEMENT THESE DAYS.
15.NOT THE NEWS.
17.LIGHT AND DARK EDGE.
21.IRRITATING GAS.
23.SEE 22 DOWN FOR CORRECT SPELLING.
24.ARRIVAL FORECAST.
26.NOT THINNER,BUT,IN A JUMBLE.
29. 7 ACROSS FOR SURE.
30.LOCK THIS TO TRAP THE LOOP.
31.SPACE ITEM PERHAPS.
32.DER WASSERMOLCH, ***
34.ARTIFICIAL INTELLIGENCE.
35.IS THIS REALLY FROM COLOGNE.
36.AMERICAN CITY.
39.OUT OF DATE PASS NON ORBITAL.
40.FROM A DISTANCE.
41.THE SAME.
43.SAILOR IN REVERSE GEAR.
45.STATIONARY,NOT LIKE THIS.
47.GREEK GOD,AND THATS NOT ALL.
48.QTH MADRID.
50.SHORT WAVE MEASURE.
51. 1 ACROSS IS IT.
52.THEY STARTED IT ALL.

GØIIC.



CHRISTMAS CROSSWORD

CLUES DOWN

1.CONTINUOUS LINE WITHOUT A BREAK.
2.MOTIONS IN SPACE.
3.SEND ANOTHER WAY.
4.SEMI PRECIOUS STONE ONE WRONG.
6.VIEW,WITH 5 ACROSS IT MUST BE RIGHT.
8.WHAT ONE GETS IN CHURCH,IF YOU LISTEN.
9.METAL WITH SPECIAL PROPERTIES.
10.FORM OF MODULATION.
12.WE GET THIS ALL THE TIME.
14.DERFARIN, NO,USEFUL IMAGE THOUGH.
16.DISGUISED SKINS,FANCY THAT.
18.YOU HAVE TWO OF THESE,BUT ONLY ONE TODAY.
19.LESS METHOD FOR USEFUL SPIRIT.
20.WITH ONE OF THESE THE WORLD IS YOURS.
22.CORRECT 23 ACROSS,IS IT THE MOON.
25.WEATHER FACSIMILE ACRONYM.
27.ABOUT FACE FRENCH CIRCUIT WITH MAN INSIDE.
28.HUMAN PERFUME,NO,SCENT MAYBE,BUT NOT IN BOTTLES.
29.GIVE SUSTINANCE TO A MUSICAL INSTRUMENT FOR GUIDANCE.
30.GO NORTH OR SOUTH FOR THESE AREAS.
33.DECODER FOR PACKET OR RTTY.
37.FLUCTUATES.
38.PRIMATIVE BY TODAYS,SORTI IN SPACE.
39.DOUBLE VOWEL,SOUNDS LIKE A NAUTICAL OKAY.
42.YOU CAN DO THIS IN ANY DIRECTION.
44.NOT FAR,SORT IT,ITS.....
46.VERY GROSS NAVAL DIVER.
47.ITS A PICK UP AT YOUR QTH.
49.LOOKS LIKE YOU COULDN'T HOLD ON TO IT.

WEATHER SATELLITE AND OTHER REMOTE SENSING PUBLICATIONS

My xyl has now been appointed as an authorised distributor for the National Remote Sensing Centre and can offer a members discount on some items. She has also negotiated a dramatic reduction in poster prices and these are now a very attractive buy. Please state that you are a RIG member when ordering and although most items are delivered from stock please give us your Christmas orders as early as possible. (Don't forget to show the list to your nearest and dearest!)

	PRICE memb.	non-memb.
BOOKS:		
Britain from Space. Colour Landsat Images & maps	11.95	12.50
Images of the World. Satellite image Atlas	12.30	12.95
Images of the Earth. Probably our best "glossy", Has to be seen. Various satellites + shuttle:	12.30	12.95
Sourcebook of Remote Sensing. Guide to products, facilities etc. Very useful for the enthusiast:	14.25	15.00
Weather Satellite Reception. by Chris Hornby. A Guide for Starters	8.75	9.75
POSTERS AND TEACHING MATERIALS. (All posters in colour.)		
Meteosat Whole disc. 400x600	1.75	1.75
British Isles. Landsat. 480x710	2.00	2.00
Europe by Satellite. NOAA HRPT. Superb. 590x780	2.50	2.50
Isle of Lewis. Landsat Thermal. Double sided. 660x810	3.00	3.00
London. Landsat colour. Spot your street!	4.50	4.95
Satellite images. (1 large, 6 small charts + booklet)	4.40	4.60
Satpack 1 & 2: NOAA images with interpretation. ea:	2.40	2.40
PRINTS: Colour gloss resolution up to 200million pixels per pic!		
Small (Landsat 195x250, Meteosat 215x200)	9.25	9.75
Large (Landsat 475x360, Meteosat 355x360)	18.50	19.50
Small framed: Black or oak	15.00	15.75
Large framed: As above.	25.50	26.95

(Whole disc. Hurricane David. British Isles, Ireland, Scotland: NOAA AVHRR, METEOSAT, Landsat GOES-E etc. Please ask for list)

VIDEOS: All videos £51.75 or £10.00 (+10.00 dep. +1.00p&p) hire.
An Introduction to Satellite Remote Sensing. 35 minutes
Towards a Greener Planet. Interpretation of images. 20 minutes.
Remote Sensing, Coastal and marine applications. 20 minutes.
NRSC image processing, coming soon.

SLIDES:		
Remote Sensing: Coastal Processes. 18slides +booklet	8.50	8.95
Remote sensing: Applications in Geology	8.50	8.95
Remote Sensing: An introduction. 26 slides + booklet	9.50	9.95

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Our full list is constantly being updated. Ring for latest list.

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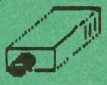

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BBC MICRO-BASED WEATHER STATION
Comprising interface card and WXSAT software package. Used with the MSR20 receiver or similar, gives superb results at a realistic price! Some of the many features include:-

Zoom - X2, X4, X8
Greyscale Control - for visual or I.R.
User-defined colour palette
North/South picture invert facility
Printer dump for hard copies
Fast X-Y picture scrole
WEFAX compatible

The MSS20 can be assembled in an evening, and comes complete with test tape for easy instant alignment!

£3 buys you a demonstration disc of typical pictures (refundable). State 40/80 track.

[The MSS20 system offers really excellent performance, and should not be confused with other BBC-based systems from elsewhere which are no comparison].

£59.95 incl.

MSG20 HI-RES FRAME STORE
A 0.5Mbyte dual 512 x 512 frame store with powerful graphics capabilities. Software driven from BBC host micro (modular interface allows alternate host machines later) provides pictures as you've never seen them before. All the usual features like zoom, scroll etc., plus eight-picture capability at 256 x 256 pixel resolution! Due to backlog of orders please allow 28 days delivery.
Some of its many features include:-

* Zoom - x1 to x8
* Window Scrolling (in zoom mode)
* Disc dumping
* Post-Reception processing (PRP)
* Up to eight pictures in 256 x 256 mode
* Two pictures in 512 x 512 mode
* Modular design for WEFAX use
* Free software upgrades
* Contrast stretching/picture enhancement.

Price (built & tested module) £349 incl
DISCOUNT of 15% on all orders before 29/2/88

YU3UMV FRAME STORE KIT
All components to populate the PCBs (which are available from Phil. Seaford).

64k Memory	£68.71 incl.
256k Memory	£78.37 incl.

LOK SYNC BOARD KIT
A complete kit of parts to populate the PCB (available from Phil. Seaford)
£25.85 incl.

MSR20 VHF RECEIVER KIT
A high-performance, dual-conversion design optimized for low noise and high sensitivity. It incorporates audio mute, electronic channel switching, and facilities for the addition of channel scanners and S-meter.
Performance summary:-

RF Bandwidth (3dB)		2.5MHz
IF Bandwidth (3dB)		50KHz
IF Frequencies	(1st)	10.7MHz
	(2nd)	300KHz
Image Rejection Ratio		>100dB
Sensitivity (12dB quieting)		0.15uV
(fully ")		0.6uV
Supply Voltage		12v
Size		133 x 115 mm

The MSR20 is built onto a glass board with printed component overlay, and is accompanied by a comprehensive step-by-step instruction manual with layout and schematic diagrams.
£56.95 incl.

MSH20 RECEIVER HARDWARE KIT
A complete kit of parts to case and finish the MSR20. Includes metal case, mains transformer, switches, complete mains lead and IEC input socket, fuse, fuse-holder, knobs, rubber feet, screws, pillars etc.
Kit now also includes mains power supply components.
£14.30 incl.

MSA20 CROSSED-DIPOLE VHF AERIAL
A high-quality, well-finished, circular polarized custom-designed aerial. crossed-dipole elements with reflectors.
£24.95 incl.
with built-in preamplifier £39.95 incl.

MSK20 137MHz PREAMPLIFIER
A very low noise MOSFET preamp to give useful signal improvements where aerial-to-receiver runs of more than a few metres exist. The kit comes complete with diecast box and BNC connectors. It takes its power via the coaxial feed, avoiding the need for additional cable runs.
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